SERVICE MANUAL

Models

RGX3000, 3800, 5100 GENERATORS

PUB-GS6679
Rev. 07/09

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NOTE
This Service Manual excludes information for engine.
As for the total servicing information as a generator set, please refer in conjunction with the Robin EX13/17/21/27 and EX30 OHC Engine Service Manual.

1. SPECIFICATIONS

MODEL			RGX3000	RGX3800	RGX5100
Generator	Type		Brush, self-exciting, 2-poles, single phase		
	Voltage regulating system		AVR type		
	AC Output				
	Rated voltage	50 Hz	110, 220, 110/220, 230, 240	110, 220, 110/220, 230, 240	110, 220, 110/220, 230, 240
	V	60 Hz	110,120, 220, 110/220, 120/240	110,120, 220, 110/220, 120/240	110,120, 220, 110/220, 120/240
	Rated current	50 Hz	18.2, 9.1, 18.2/9.1, 8.7, 8.3	21.8, 10.9, 21.8/10.9, 10.4, 10	32.7, 16.4, 32,7/16.4, 15.7, 15
	A	60 Hz	21.8, 20, 10.9, 21.8/10.9, 20/10	26.4, 24.2, 13.2, 26.4/13.2, 24.2/12.1	38.2, 35, 19.1, 38.2/19.2, 35/17.5
	Rated output	50 Hz	2000	2400	3600
	VA (W)	60 Hz	2400	2900	4200
	Rated power factor		1.0		
	Safety device type		Fuse-less circuit breaker		
	DC Output				
	Rated voltage	V	12		
	Rated current	A	8.3		
	Safety device type		Fuse-less circuit breaker		
Engine	Model		EX17D	EX21D	EX30D
	Type		ROBIN, Air-cooled, 4-stroke, OHC, Gasoline Engine		
	Displacement	mL	169	211	287
	Fuel		Automotive Unleaded Gasoline		
	Fuel tank capacity	L	12.8 (16.6)*1		17.8 (21.5)*1
	Engine oil capacity	L	0.6		1.0
	Spark plug		BR-6HS (NGK)		
	Starting system		Recoil starter	Electric starter / Recoil	
Direction of rotation			Counter - clockwise		
Dimension	Length	mm	600	620 (870)*2	675 (925)*2
	Width	mm	420	450	510
	Height	mm	500	500	570
Dry weight		kg	47	52 (57.5)*3	69 (79)*3

Specifications are subject to change without notice.

*1: ( ) shows the filled amount up to the "LEVEL" position.

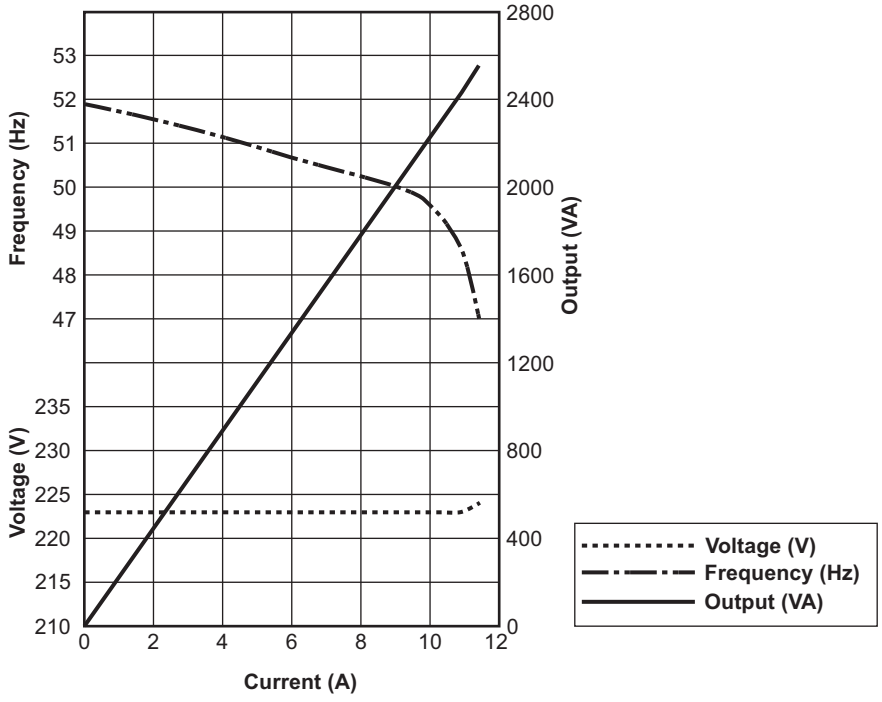
*2: ( ) shows dimensions with Battery frame.

*3: ( ) shows dry weight with Electric starter.

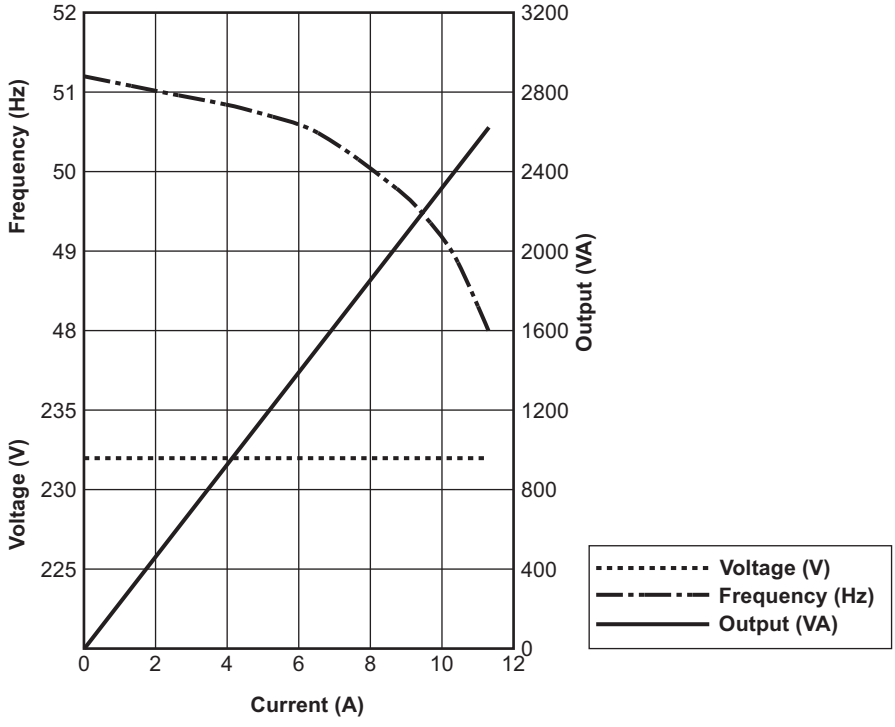
2. PERFORMANCE CURVES

•RGX3000

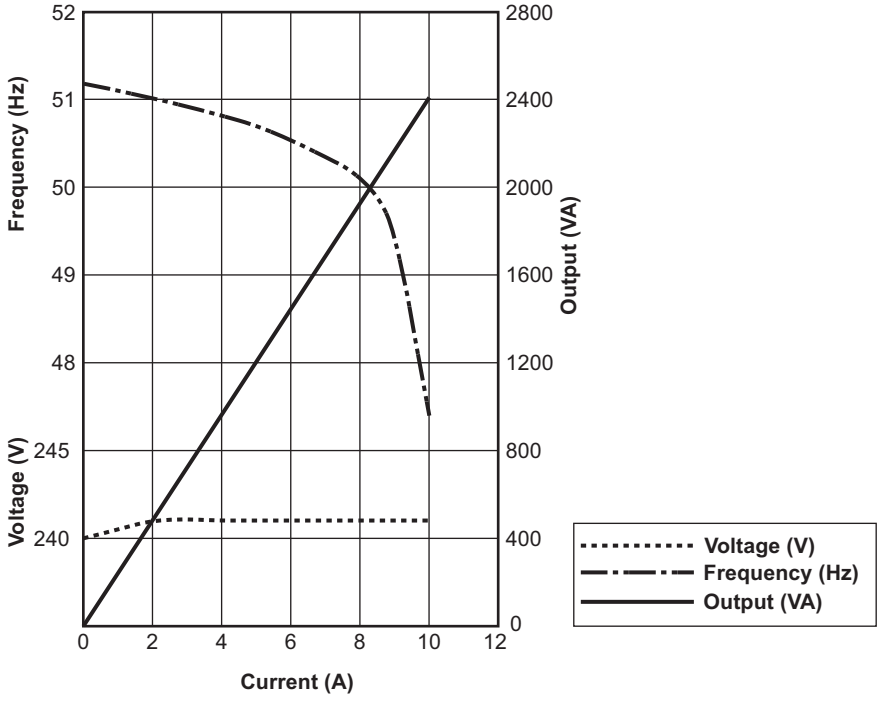
50Hz-220V



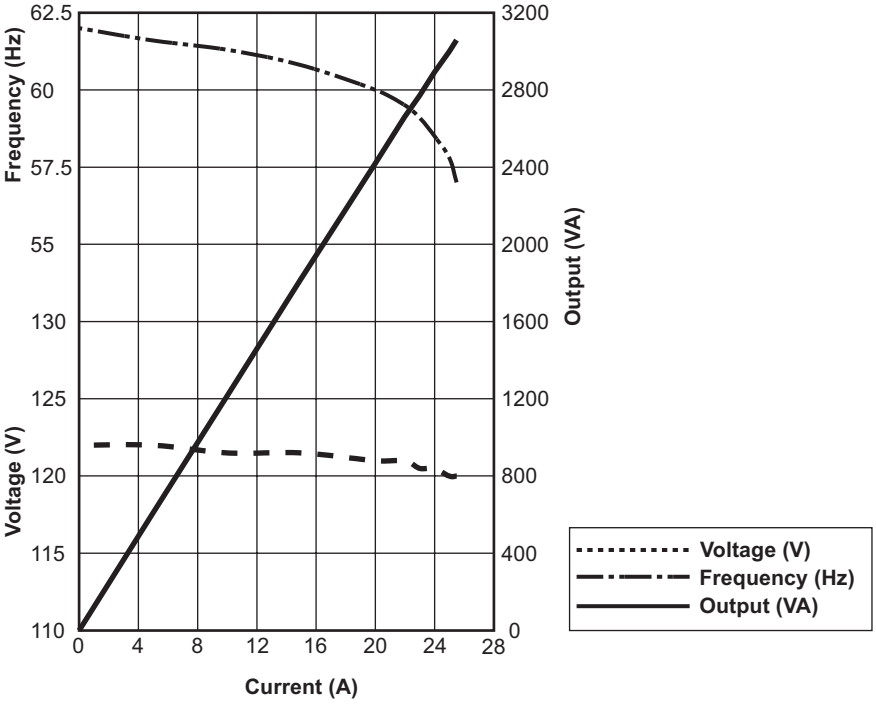
50Hz-230V



50Hz-240V

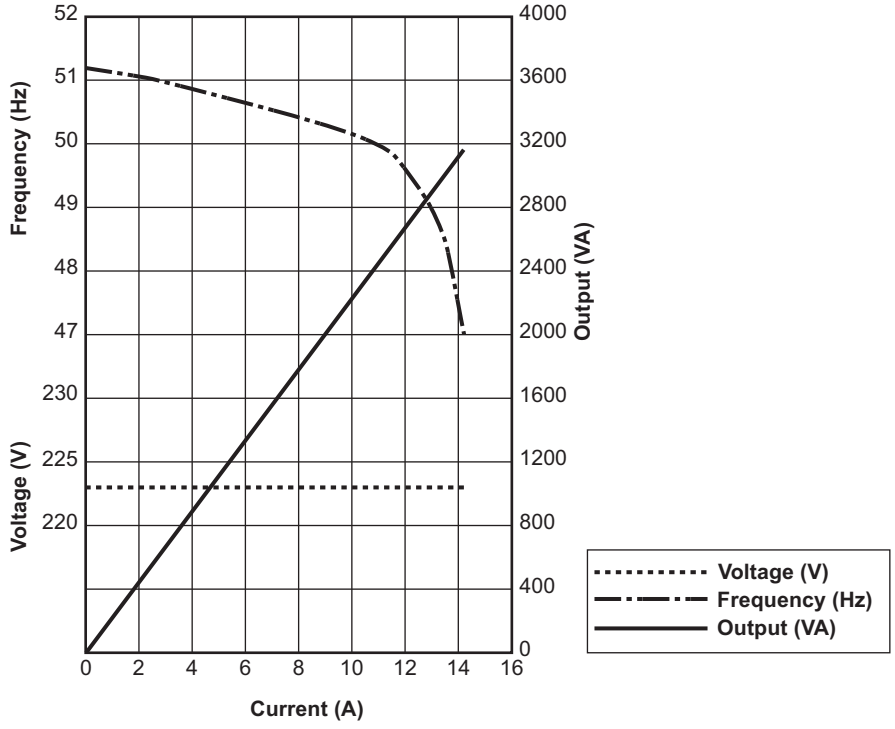


60Hz-120V

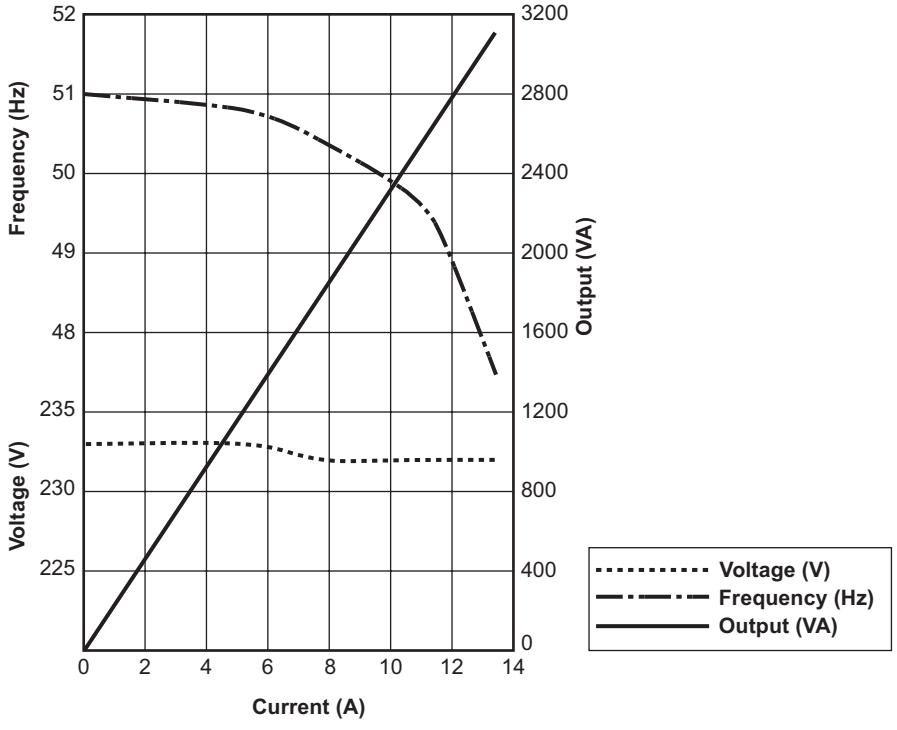


•RGX3800

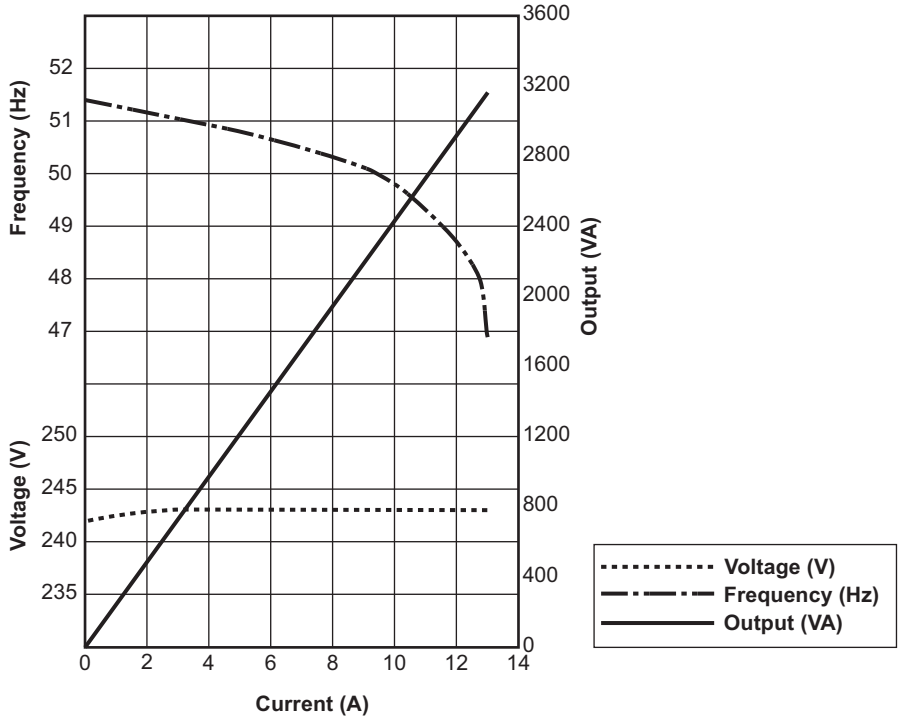
50Hz-220V



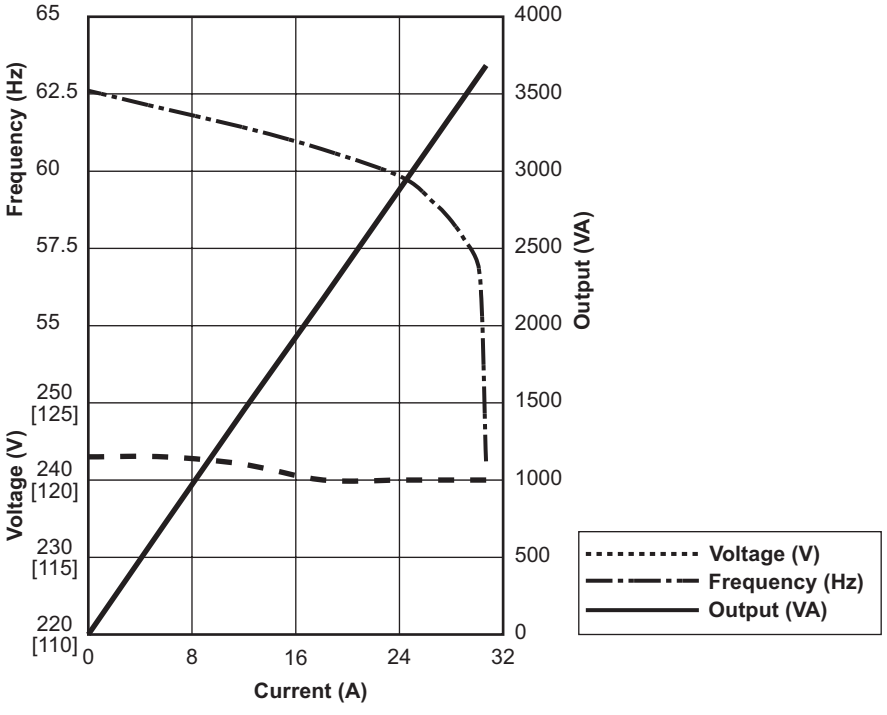
50Hz-230V



50Hz-240V



60Hz-120/240V

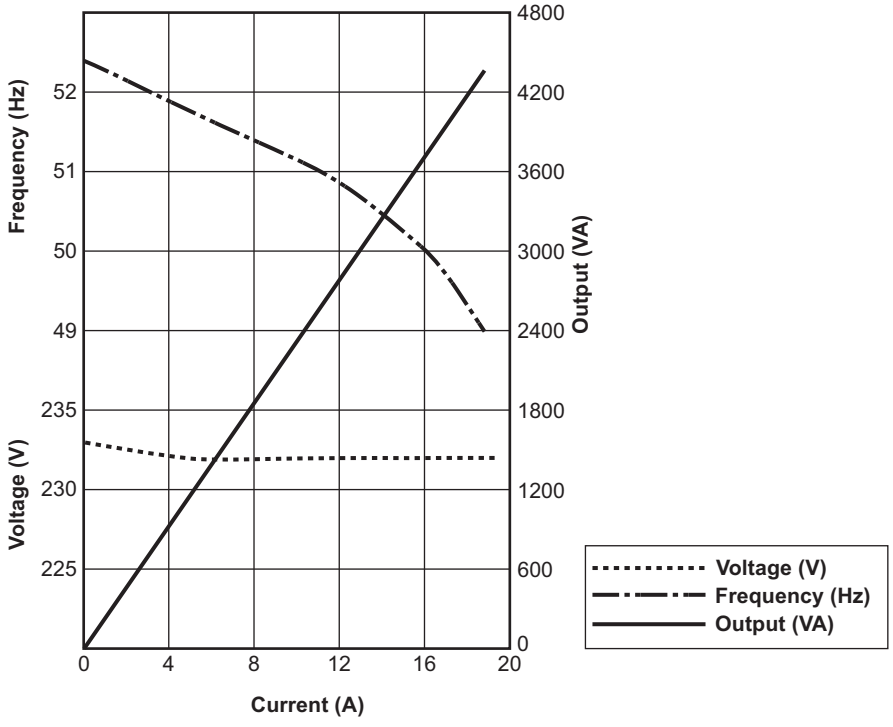


•RGX5100

50Hz-220V

N / A

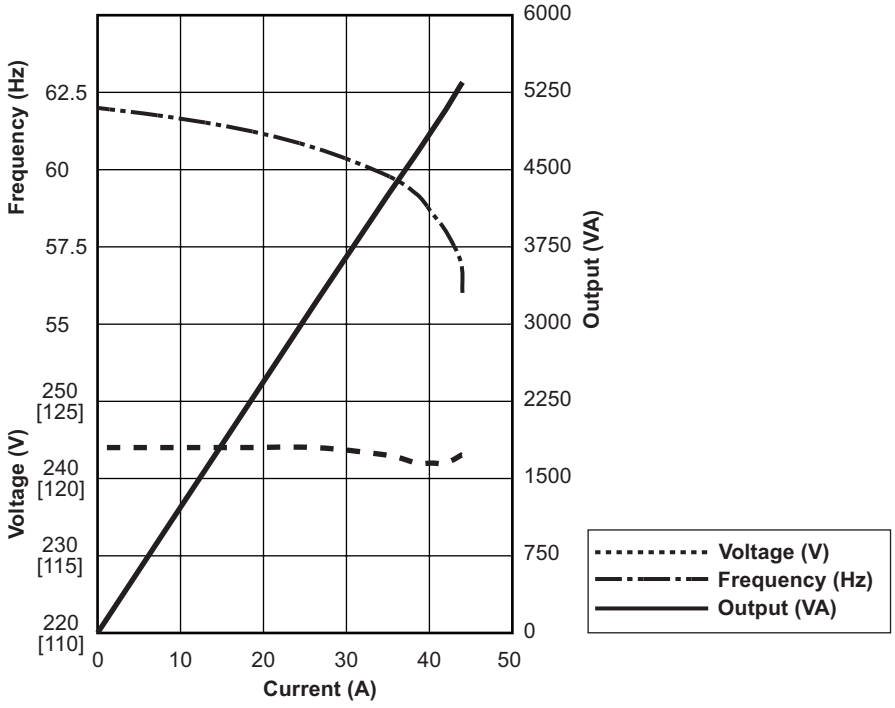
50Hz-230V



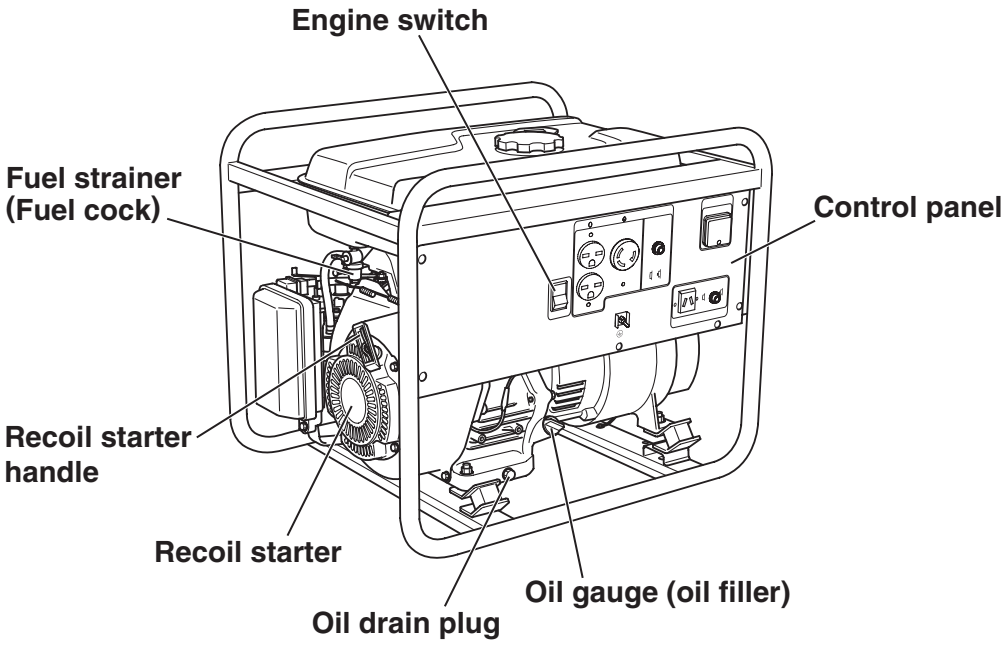
50Hz-240V

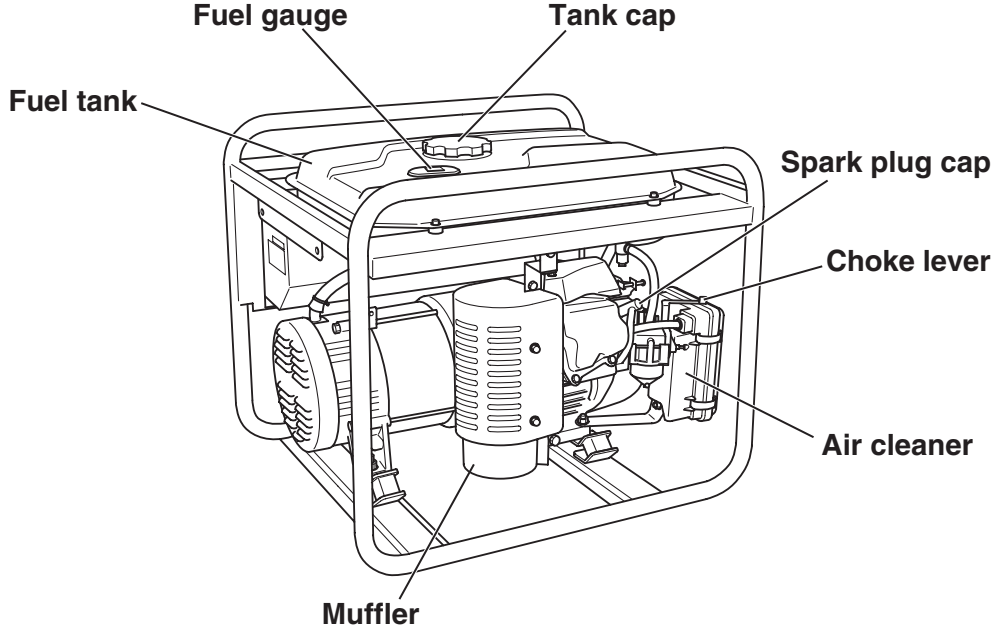
N / A

60Hz-120/240V



3. GENERAL DESCRIPTION

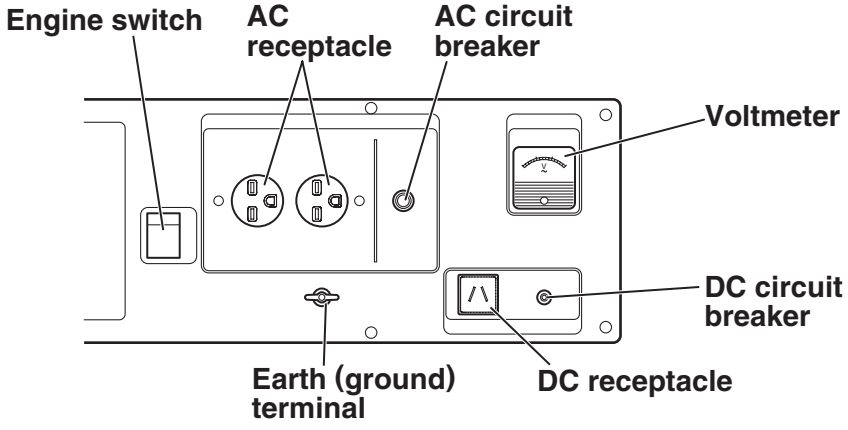




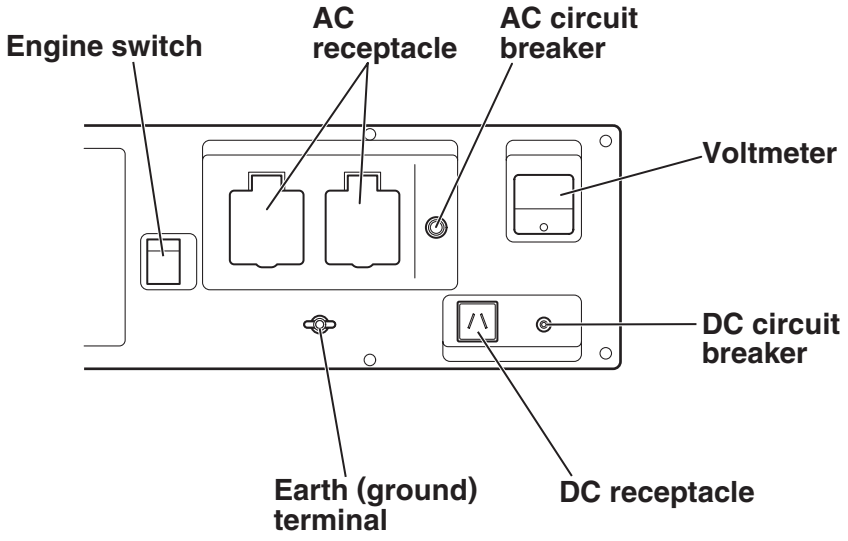
CONTROL PANEL

•RGX3000

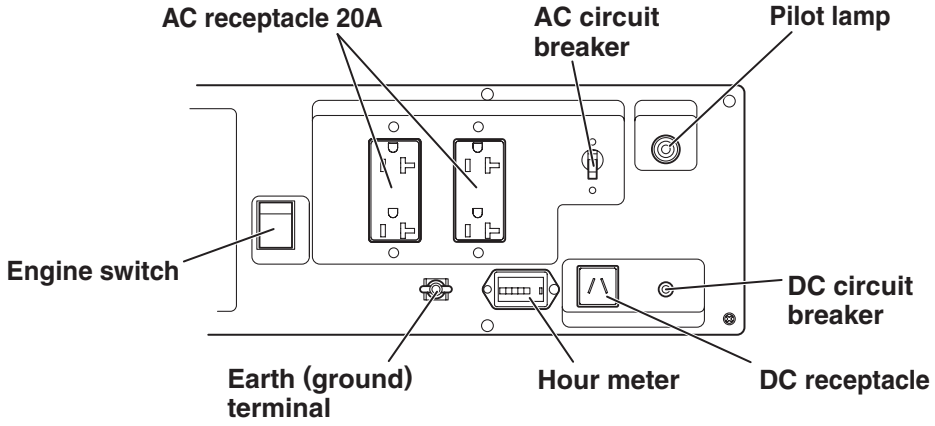
(50Hz-220V, 240V)



(50Hz-230V)

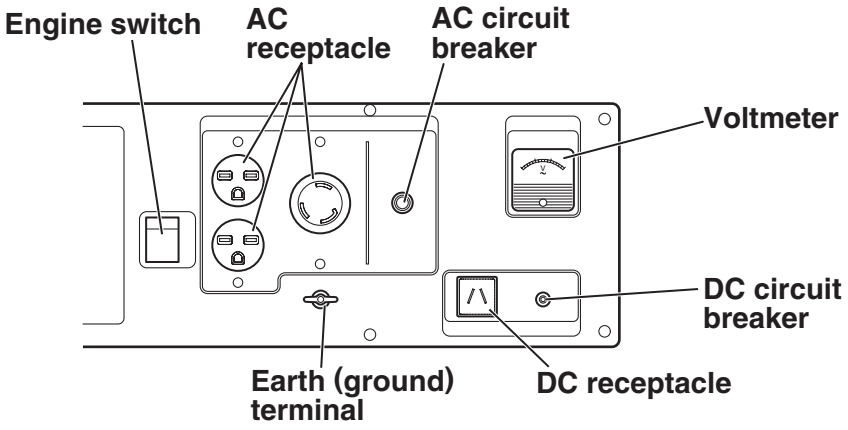


(60Hz-120V)

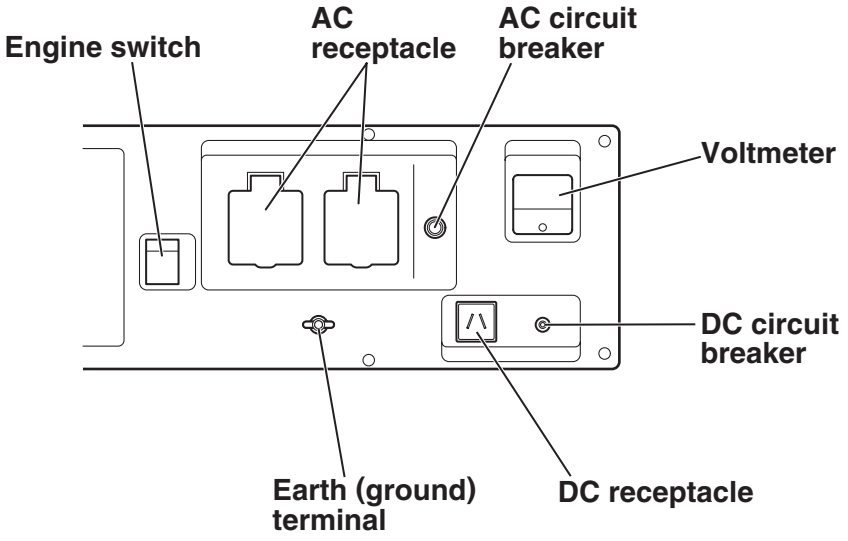


•RGX3800

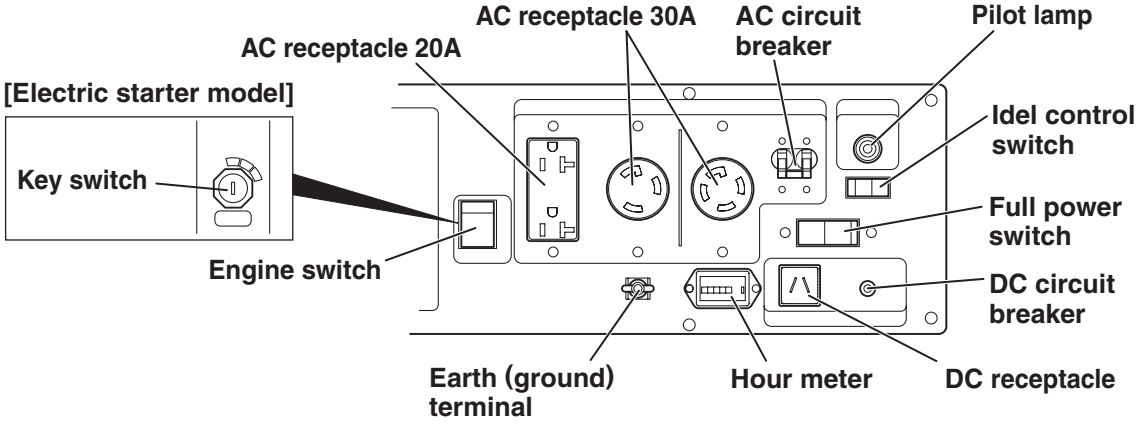
(50Hz-220V, 240V)



(50Hz-230V)

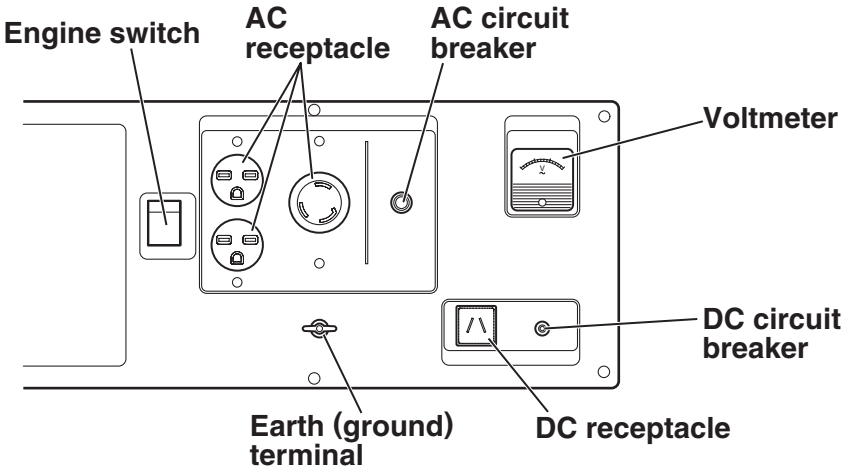


(60Hz-120/240V)

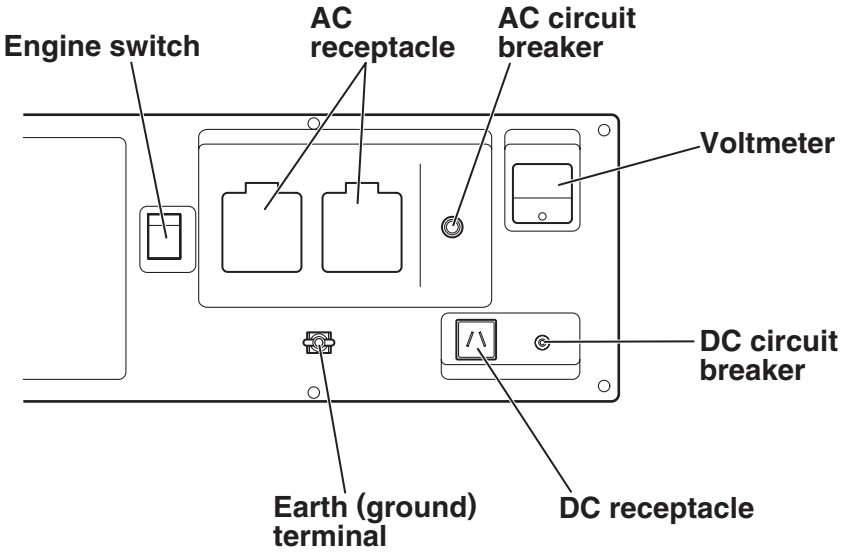


•RGX5100

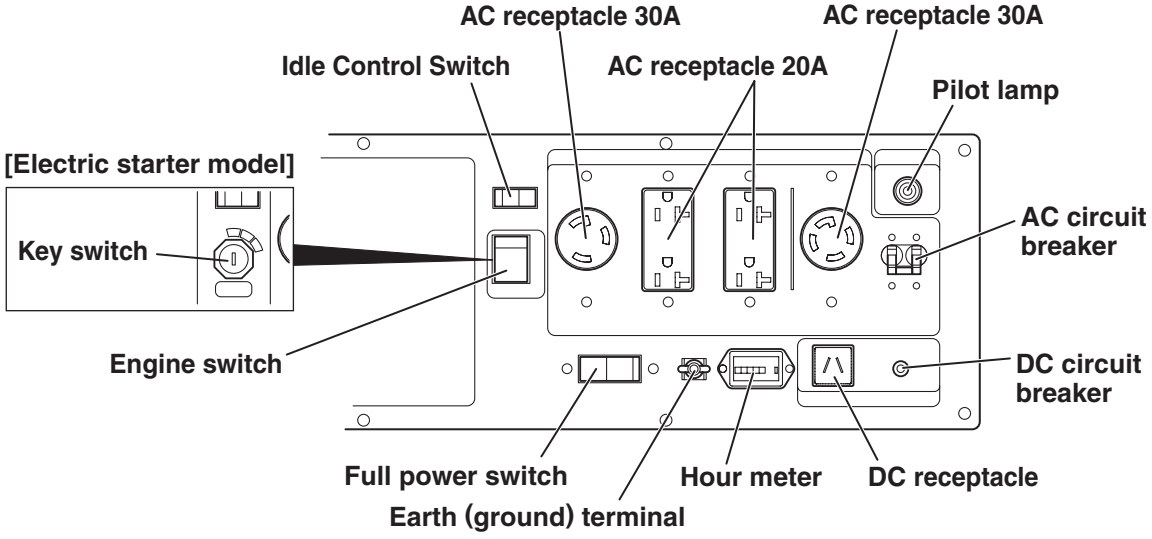
(50Hz-220V, 240V)



(50Hz-230V)



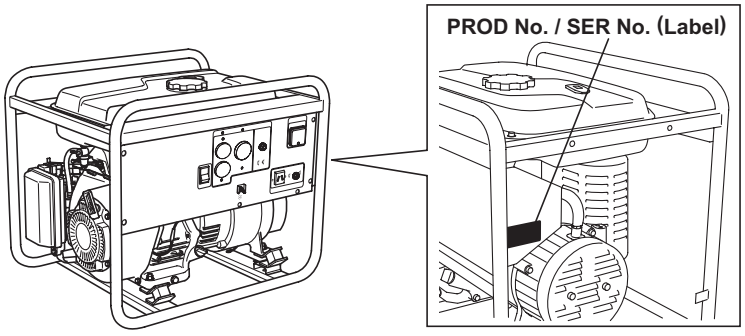
(60Hz-120/240V)



SERIAL NUMBER

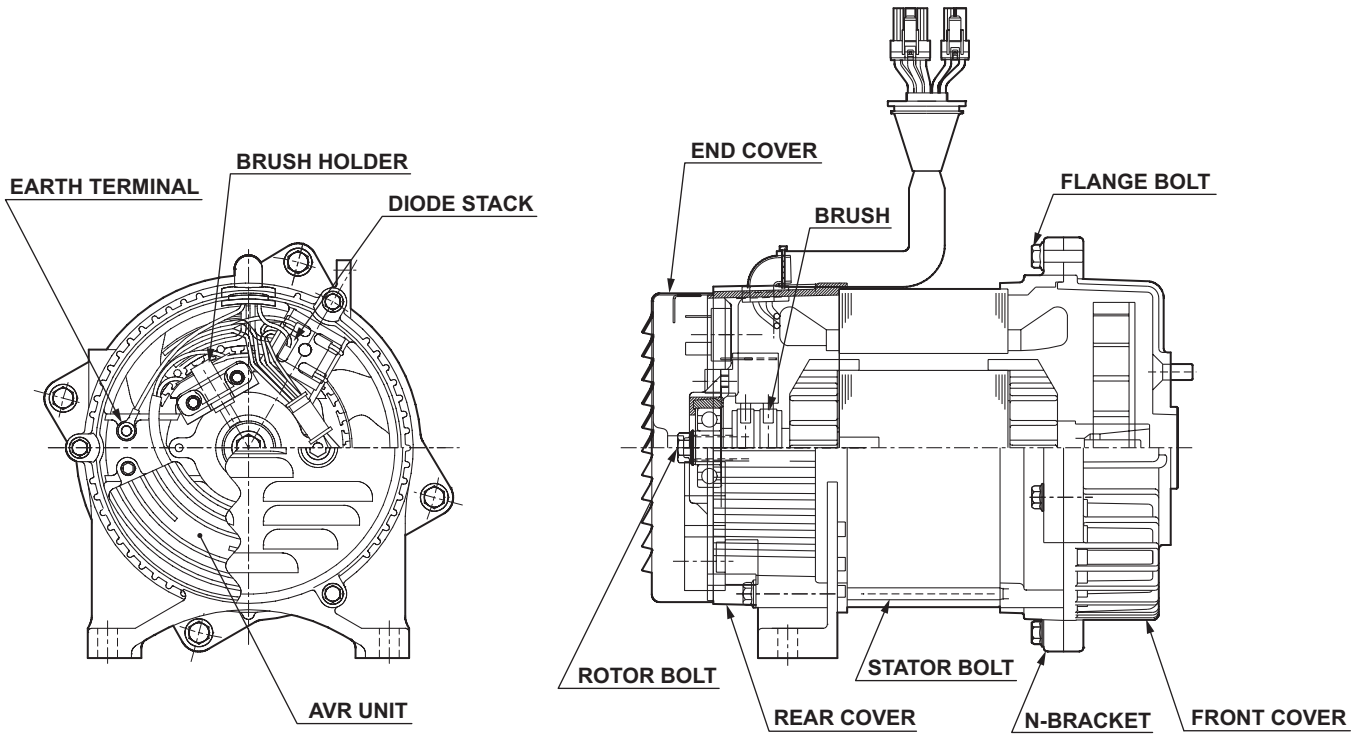
Serial number is stamped on the label stuck on the control box.

NOTE : Always specify serial number when inquiring about the generator or ordering spare parts in order to get correct parts and accurate service.

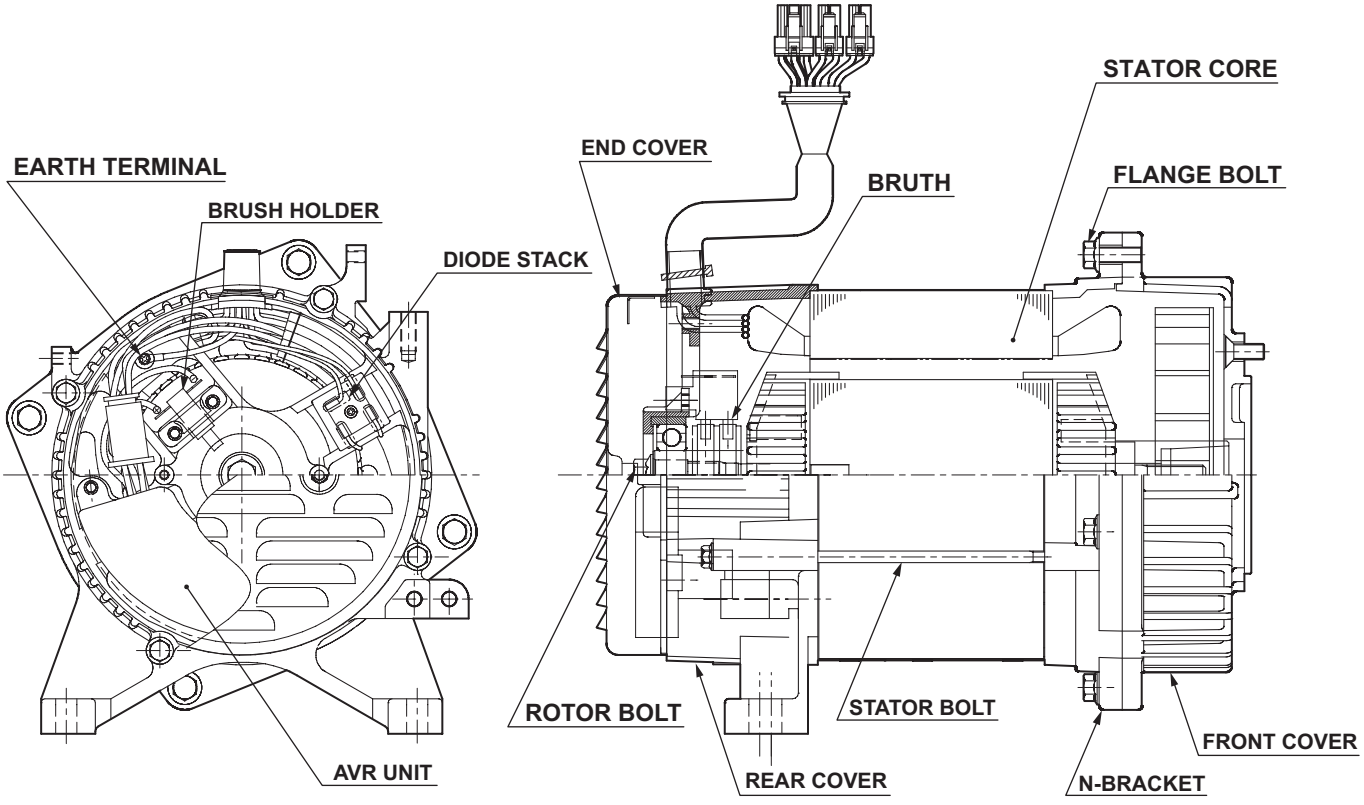


CONSTRUCTION

•RGX3000 / RGX3800



•RGX5100



4. RANGE OF APPLICATIONS

Generally, the power rating of an electrical appliance indicates the amount of work that can be done by it. The electric power required for operating an electrical appliance is not always equal to the output wattage of the appliance. The electrical appliances generally have a label showing their rated voltage, frequency, and power consumption (input wattage). The power consumption of an electrical appliance is the power necessary for using it. When using a generator for operating an electrical appliance, the power factor and starting wattage must be taken into consideration.

In order to determine the right size generator, it is necessary to add the total wattage of all appliances to be connected to the unit.

Refer to the followings to calculate the power consumption of each appliance or equipment by its type.

(1) Incandescent lamp, heater, etc. with a power factor of 1.0

Total power consumption must be equal to or less than the rated output of the generator.
Example : A rated 3000W generator can turn thirty 100W incandescent lamps on.

(2) Fluorescent lamps, motor driven tools, light electrical appliances, etc. with a smaller power factor

Select a generator with a rated output equivalent to 1.2 to 2 times of the power consumption of the load. Generally the starting wattage of motor driven tools and light electrical appliances are 1.2 to 3 times lager than their running wattage.
Example: A rated 250 W electric drill requires a 400 W generator to start it.

NOTE 1: If a power factor correction capacitor is not applied to the fluorescent lamp, the more power shall be required to drive the lamps.

NOTE 2: Nominal wattage of the fluorscent lamp generally indicates the output wattage of the lamp. Therefore, if the fluorescent lamp has no special indication as to the power consumption, efficiency should be taken into account as explained in Item (5) on the following page.

(3) Mercury lamps with a smaller power factor

Loads for mercury lamps require 2 to 3 times the indicated wattage during start-up.
Example : A 400 W mercury lamp requires 800 W to 1200 W power source to be turned on. A rated 3000 W generator can power two or three 400 W mercury lamps.

(4) Initially loaded motor driven appliances such as water pumps, compressors, etc.

These appliances require large starting wattage which is 3 to 5 times of running wattage.
Example : A rated 900 W compressor requires a 4500 W generator to drive it.

NOTE 1: Motor-driven appliances require the aforementioned generator output only at the starting. Once their motors are started, the appliances consume about 1.2 to 2 times their rated power consumption so that the excess power generated by the generator can be used for other electrical appliances.

NOTE 2 : Motor-driven appliances mentioned in items (3) and (4) vary in their required motor starting power depending on the kind of motor and start-up load. If it is difficult to determine the optimum generator capacity, select a generator with a larger capacity.

(5) Appliances without any indication as to power consumption

Some appliances have no indication as to power consumption; but instead the work load (output) is indicated. In such a case, power consumption is to be worked out according to the numerical formula mentioned below.

$$\frac{\text{(Output of electrical appliance)}}{\text{(Efficiency)}} = \text{(Power consumption)}$$

Efficiencies of some electrical appliances are as follows :

Single-phase motor . . . . 0.6 to 0.75
Fluorescent lamp . . . . . 0.7 to 0.8

(The smaller the motor, the lower the efficiency.)

Example 1 : A 40W fluorescent lamp means that its luminous output is 40W. Its efficiency is 0.7 and accordingly, power consumption will be 40÷0.7= 57W. As explained in Item (2), multiply this power consumption value of 57 W by 1.2 to 2 and you will get the figure of the necessary capacity of a generator. In other words, a generator with a rated output of 1000W capacity can light nine to fourteen 40 W fluorescent lamps.

Example 2 : Generally speaking, a 400 W motor means that its work load is 400 W. Efficiency of this motor is 0.7 and power consumption will be 400÷0.7= 570 W. When this motor is used for a motor-driven tool, the capacity of the generator should be multiple of 570 W by 1.2 to 3 as explained in the Item (3). 570 (W) × 1.2 to 3 = 684 (W) to 1710 (W)

Applications	Applicable Wattage(approx. W)					
	50Hz			60Hz		
	RGX3000	RGX3800	RGX5100	RGX3000	RGX3800	RGX5100
Incandescent lamp, Heater	2000	2400	3500	2400	2700	3700
Fluorescent lamp, Electric tool	1100	1200	1800	1200	1400	1900
Mercury lamp	800	900	1300	900	1000	1400
Pump, Compressor	500	550	800	550	600	850

Table. 4-1

NOTES : Wiring between generator and electrical appliances

1. Allowable current of cable

Use a cable with an allowable current that is higher than the rated input current of the load (electrical appliance). If the input current is higher than the allowable current of the cable used, the cable will become excessively heated and deteriorate the insulation, possibly burning it out. Table 4-2 shows cables and their allowable currents for your reference.

2.Cable length

If a long cable is used, a voltage drop occurs due to the increased resistance in the conductors decreasing the input voltage to the load (electrical product). As a result, the load can be damaged. Table 4-2 shows voltage drops per 100 meters of cable.

Nominal cross section	**A.W.G.**	**Allowable current**	**No.of strands / strands dia.**	**Resistance**	**Current Amp.**							
mm^2	No.	A	No./mm	Ω/100m	1A	3A	5A	8A	10A	12A	15A	
0.75	18	7	30/0.18	2.477	2.5V	7.5V	12.5V	—	—	—	—	**Voltage drop**
1.25	16	12	50/0.16	1.486	1.5V	4.5V	7.5V	12V	15V	18V	—	
2.0	14	17	37/0.26	0.952	1V	3V	5V	8V	10V	12V	15V	
3.5	12 to 10	23	45/0.32	0.517	—	1.5V	2.5V	4V	5V	6.5V	7.5V	
5.5	10 to 8	35	70/0.32	0.332	—	1V	2V	2.5V	3.5V	4V	5V	

Table. 4-2

Voltage drop indicates as $V = \frac{1}{100} \times R \times I \times L$

R means resistance (Ω/100 m) on the above table.
I means electric current through the wire (A).
L means the length of the wire (m).

The length of wire indicates round length, it means twice the length from generator to electrical tools.

5. MEASURING PROCEDURES

5-1 MEASURING INSTRUMENTS

(1) VOLTMETER

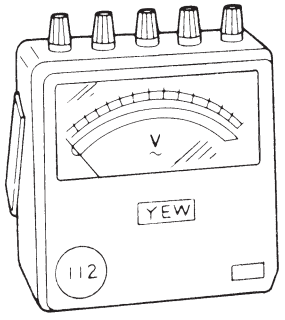
AC voltmeter is necessary.

The approximate AC voltage ranges of the voltmeters to be used for various types of generators are as follows :

0 to 150 V : Type with an output voltage of 110 or 120 V

0 to 300 V : Type with an output voltage of 220, 230 or 240 V

0 to 150 V, 0 to 330 V : Dual voltage type



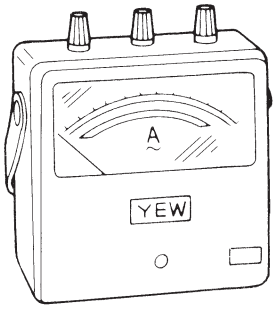
FOR AC

(2) AMMETER

AC ammeter is necessary.

An AC ammeter with a range that can be changed according to the current rating of a given generator is most desirable.

(About 10 A, 20 A, 100 A)

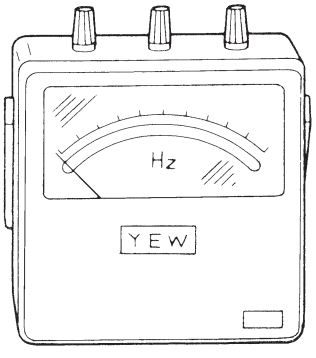


FOR AC

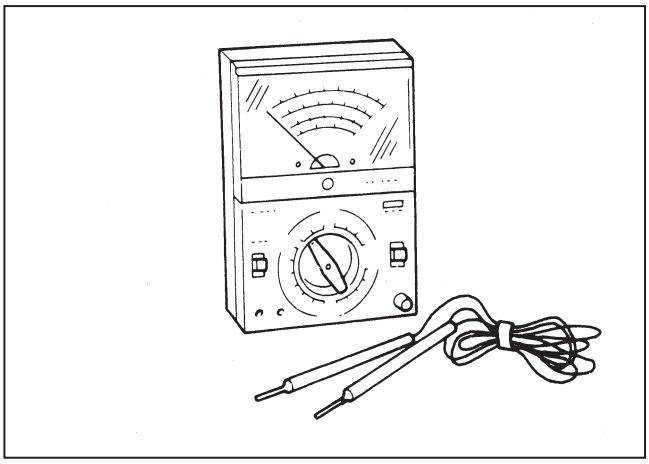
(3) FREQUENCY METER

Frequency range : About 45 to 65Hz

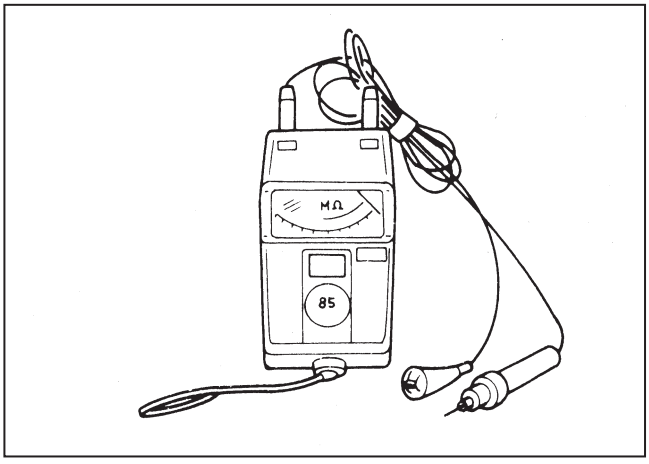
NOTE : Be careful of the frequency meter's input voltage range.



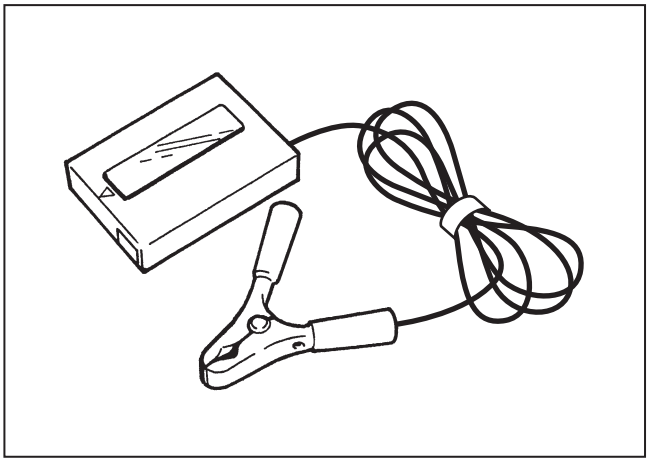
(4) CIRCUIT TESTER
Used for measuring resistance, etc.



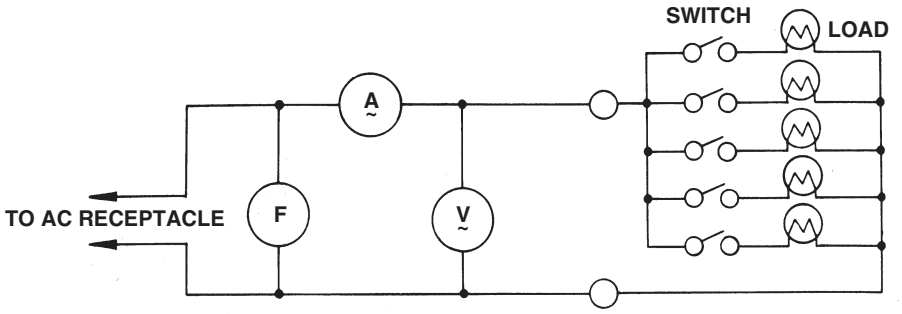
(5) MEGGER TESTER
Used for measuring generator insulation resistance.
Select one with testing voltage range of 500V.



(6) TACHOMETER
Use the contactless type tacho meter.



5-2 AC OUTPUT MEASURING

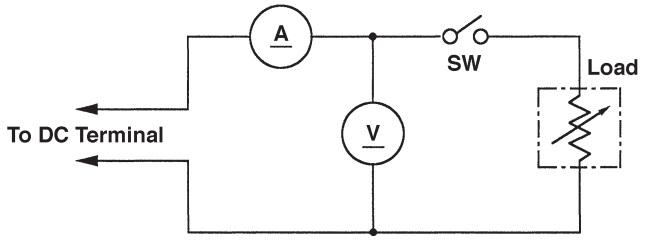


Use a circuit above for measuring AC output. A hot plate or lamp with a power factor of 1.0 may be used as a load. Adjust the load and rpm. and check that the voltage range is as specified in the following table at the rated amperage and rated rpm.

Model	Hz	Rated voltage					
		110V	120V	220V	230V	240V	
RGX3000	50	107-115	—	219-228	229-238	239-248	Voltage range
	60	107-115	118-127	219-228	—	239-248	
RGX3800	50	107-115	—	219-228	229-238	239-248	
	60	107-115	118-127	219-228	—	239-248	
RGX5100	50	107-115	—	219-228	229-238	239-248	
	60	107-115	118-127	219-228	—	239-248	

5-3 DC OUTPUT MEASURING

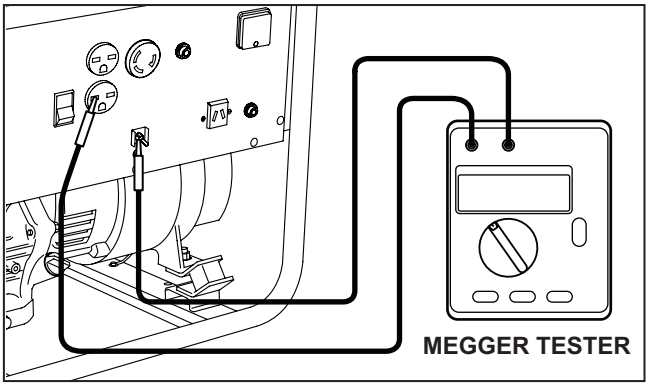
Measurement of DC output is executed with the switch turned ON while the current is regulated at 8.3A by adjusting the load to the generator. If the voltage is within the range from 10V, the voltage output is normal.



NOTE : If a battery is connected as a load to the generator, the DC output voltage will increase by approximately 1 to 2 V. Therefore, carefully observe the electrolyte level and do not overcharge the battery.

5-4 MEASURING INSULATION RESISTANCE

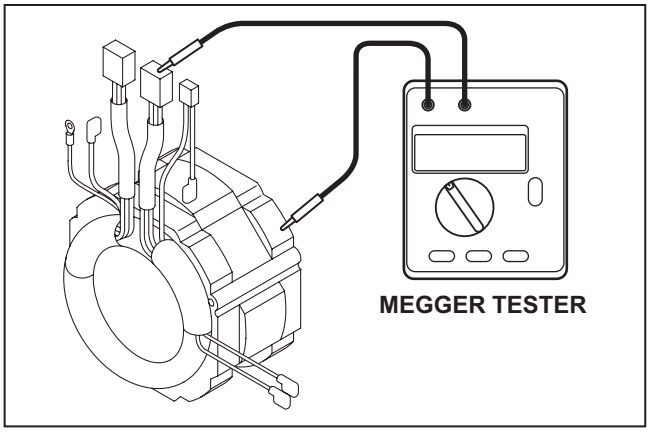
Use a megger tester to check the insulation resistance. Remove the control panel, and disconnect the connector of GREEN lead for ground. Connect a megger tester to one of receptacle output terminals and the ground terminal, then measure the insulation resistance.



An insulation resistance of 1 megohm or more is normal.
(The original insulation resistance at the time of shipment from the factory is 10 megohm or more.)
If it is less than 1 megohm, disassemble the generator and measure the insulation resistance of the stator, rotor and control panel individually.

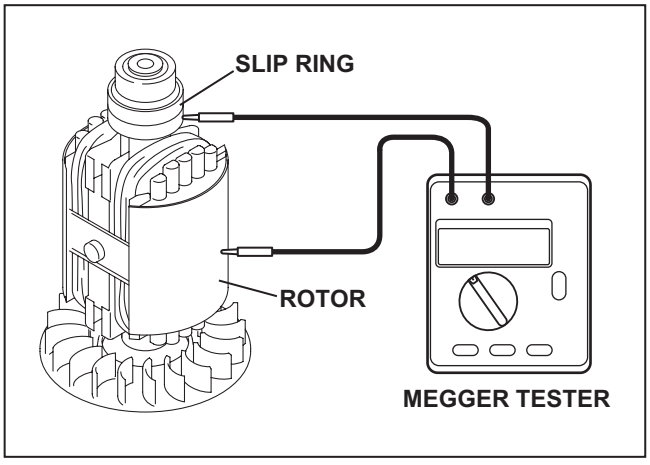
(1) STATOR

Measure the insulation resistance between each lead wire and the core.



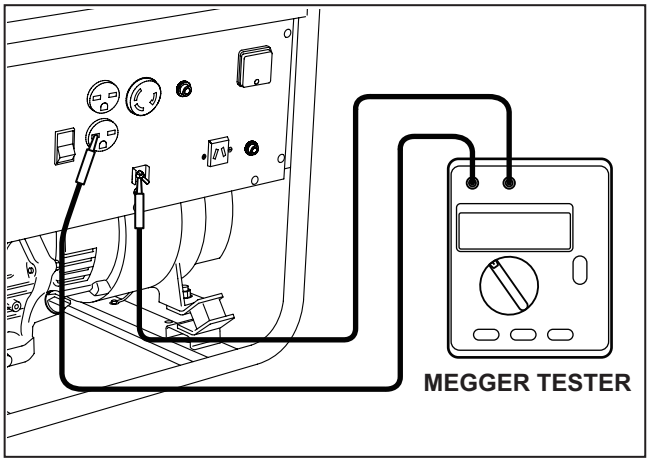
(2) ROTOR

Measure the insulation resistance between the slip ring and the core.



(3) CONTROL PANEL

Measure the insulation resistance between the live parts and the grounded parts.



Any part where the insulation resistance is less than 1MΩ has faulty insulation, and may cause electric leakage and electric shock.

Replace the faulty part.

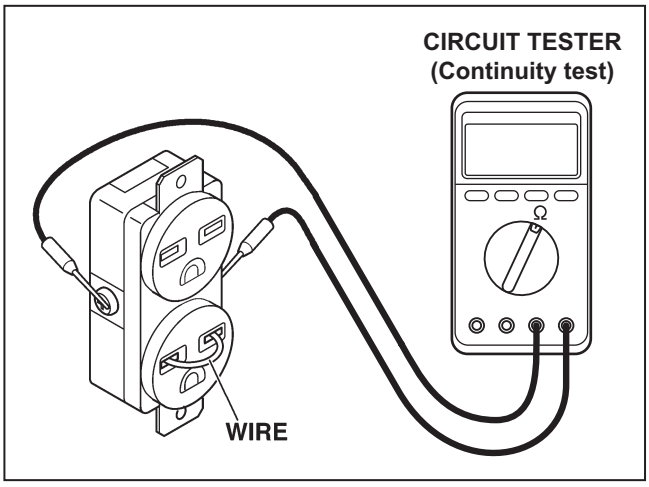
6. CHECKING FUNCTIONAL MEMBERS

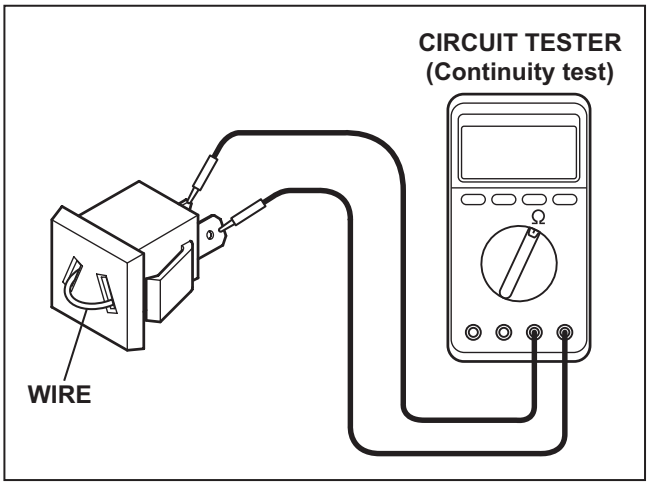
6-1 RECEPTACLES

Using a circuit tester, check continuity between the two terminals at the rear of the receptacles while the receptacle is mounted on the control panel.

When continuity is found between the output terminals of the receptacle with a wire connected across these terminals, the receptacle is normal.

When the wire is removed and no continuity is found between these terminals, the receptacles are also normal.

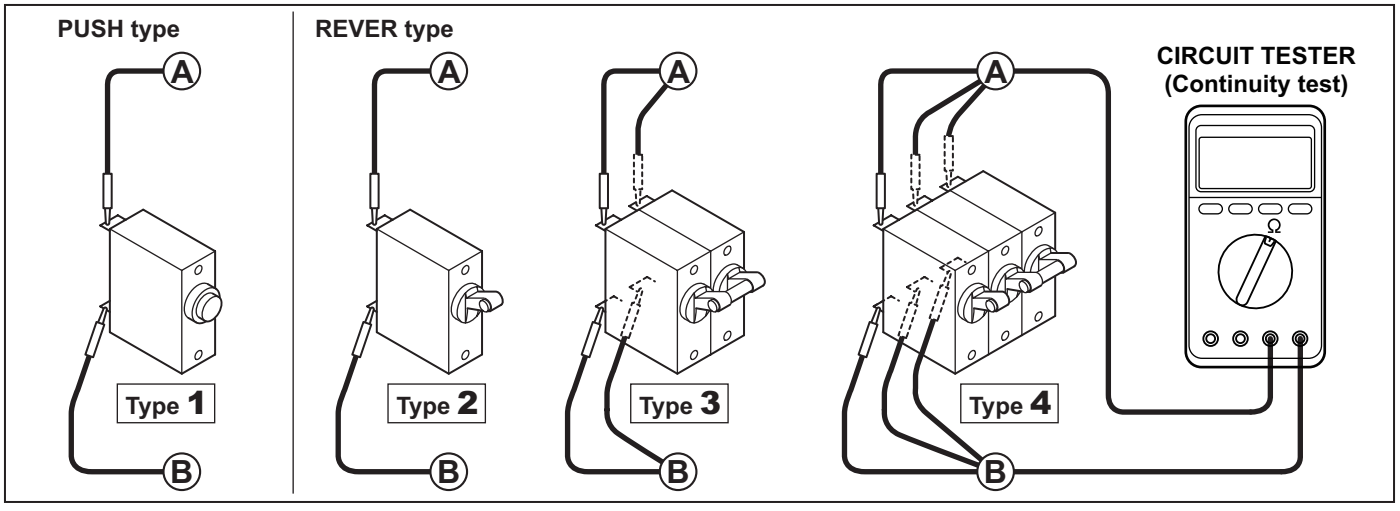




6-2 CIRCUIT BREAKER

Check continuity between each of two terminals at the rear of the circuit breaker while it is mounted on the control panel.

Normally, there is continuity between each of the two when the circuit breaker is on while there is no continuity when the circuit breaker is off.



•AC CIRCUIT BREAKER

Model	Frequency	Rated output	Rated voltage	Rated fault current	Type
RGX3000	50Hz	2000VA	220V	10A	1
			230V	10A	1
			240V	10A	1
	60Hz	2400VA	120V	23A	2
			110V / 220V	12A	3
RGX3800	50Hz	2400VA	220V	12A	1
			230V	12A	1
			240V	10A	1
	60Hz	2900VA	110V / 220V	15A	3
			120V / 240V	15A	3
RGX5100	50Hz	3600VA	220V	20A	1
			230V	20A	1
			240V	15A	1
	60Hz	4200VA	110V / 220V	20A	3
			120V / 240V	20A	3

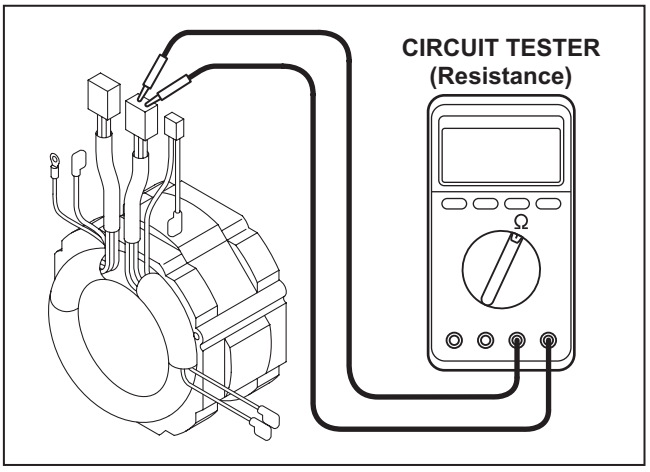
•DC CIRCUIT BREAKER

Model	Rated current	Rated voltage	Rated fault current	Type
RGX3000 RGX3800 RGX5100	8.3A	12V	10A	1

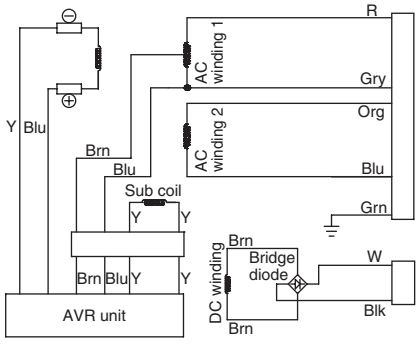
6-3 STATOR

Disengage connectors on the wires from stator and check the resistance between wires with a circuit tester referring to the following table.

NOTE : If the circuit tester is not sufficiently accurate, it may not show the values given and may give erroneous readings. Erroneous readings will also occur when there is a wide variation of resistance among coil windings or when measurement is performed at ambient temperatures different from 20 °C (68 °F).



1) RGX3000 / RGX3800



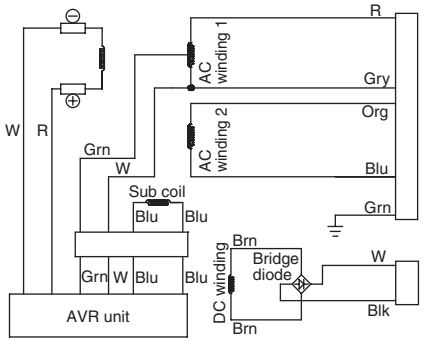
•RGX3000 **(Ω)**

		50Hz-220V	50Hz-230V	50Hz-240V	60Hz-120V	60Hz-110/220V
AC WINDING 1	**RED - GRAY**	0.980	1.042	1.234	0.851	0.749
AC WINDING 2	**ORANGE - BLUE**	0.980	1.042	1.234	0.851	0.749
SUB COIL	**YELLOW - YELLOW**	3.682	3.530	3.570	2.390	2.370
DC WINDING	**BROWN - BROWN**	0.193	0.238	0.215	0.189	0.191
AC WINDING 1	**BROWN - BLUE**	N / A	0.185	N / A	0.137	N / A

•RGX3800 **(Ω)**

		50Hz-220V	50Hz-230V	50Hz-240V	60Hz-110/220V	60Hz-120/240V
AC WINDING 1	**RED - GRAY**	0.772	0.753	0.902	0.605	0.615
AC WINDING 2	**ORANGE - BLUE**	0.772	0.753	0.902	0.605	0.615
SUB COIL	**YELLOW - YELLOW**	3.100	3.030	3.121	2.080	2.060
DC WINDING	**BROWN - BROWN**	0.186	0.172	0.183	0.187	0.163
AC WINDING 1	**BROWN - BLUE**	N / A	0.137	N / A	N / A	0.103

2) RGX5100



•RGX5100 **(Ω)**

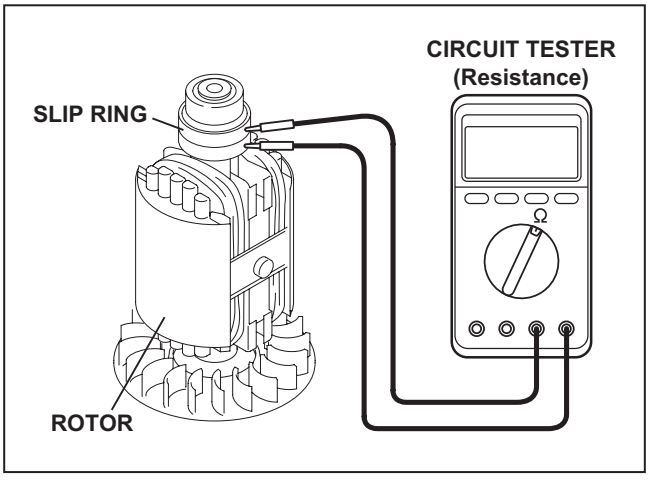
		50Hz-220V	50Hz-230V	50Hz-240V	60Hz-110/220V	60Hz-120/240V
AC WINDING 1	**RED - GRAY**	0.390	0.367	0.429	0.329	0.317
AC WINDING 2	**ORANGE - BLUE**	0.390	0.367	0.429	0.329	0.317
SUB COIL	**BLUE - BLUE**	1.748	1.613	1.746	1.610	1.496
DC WINDING	**BROWN - BROWN**	0.147	0.169	0.147	0.133	0.133
AC WINDING 1	**GREEN - WHITE**	N / A	0.074	N / A	N / A	0.060

6-4 ROTOR ASSEMBLY

1) Field coil
Remove the brush holder and measure resistance between the slip rings.

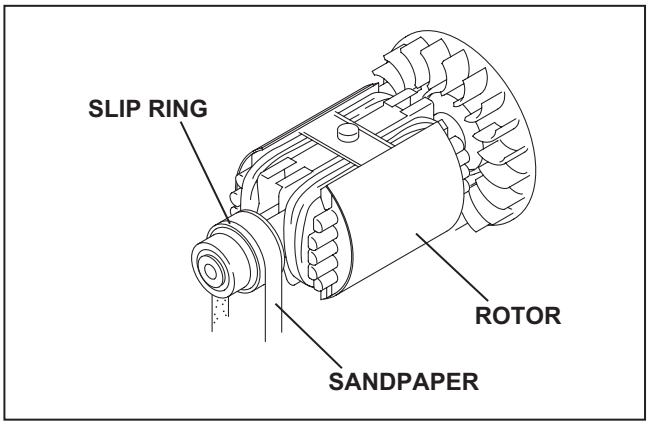
(Ω)

Rotor (Slip ring)	50Hz			60Hz		
	220V	**230V**	**240V**	**120V**	**240V**	**220V**
RGX3000	45.0	45.0	45.0	45.0	45.0	—
RGX3800	49.3	49.3	49.3	—	49.3	49.3
RGX5100	47.0	47.0	47.0	—	47.0	47.0



NOTE : If the circuit tester is not sufficiently accurate, it may not show the values given and may give erroneous readings.
Erroneous reading will also occur when there is a wide variation of resistance among coil windings or when measurement is performed at ambient temperatures different from from 20°C (68°F).

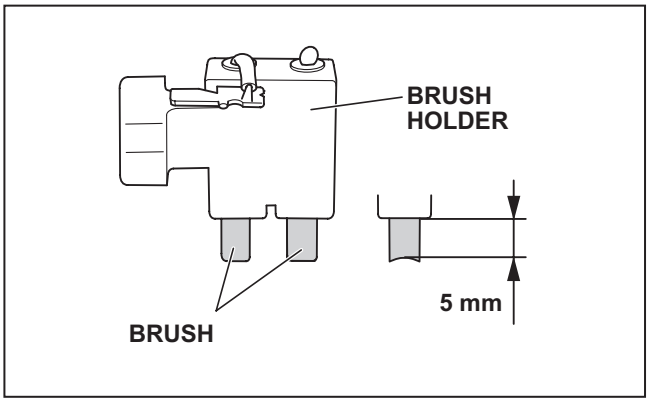
2) Cleaning Slip rings
The slip ring surfaces must be uniformly bright. Slip rings showing black spots, excessive wear, or uneven wear must be repaired. A stained slip ring lowers generator efficiency and output voltage. Polish the slip rings with fine sandpaper while turning the rotor until rough spots disappear. Care should be taken not to touch the rotor coils with the sandpaper.



6-5 BRUSH

The brushes must be smooth where they contact the slip rings. If not, polish smooth the brushes with sandpaper. A brush that is not smooth produces arcs between the brush and slip ring leading to possible damage. Usable brush lengths are from 5 mm to 11 mm (0.20 " to 0.43").

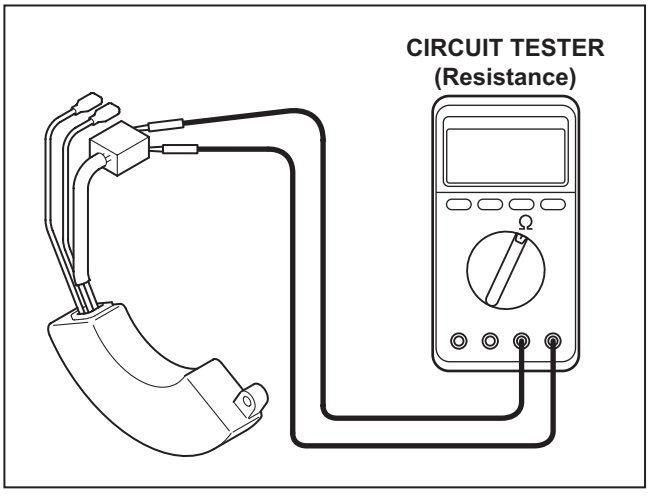
A brush shorter than 5 mm must be replaced because decreased contact pressure between the brush and slip ring lowers generator efficiency and output voltage.



6-6 A.V.R. (AUTOMATIC VOLTAGE REGULATOR)

1) Features
This A.V.R. operates to control the field current in order to maintain the output voltage for the AC current, which generated by the magnetic flux by the field coil.

2) A.V.R. trouble may be identified by simply looking at the A.V.R., or by the inter-lead resistance with a tester, or actually mounting it in the generator and operating it.

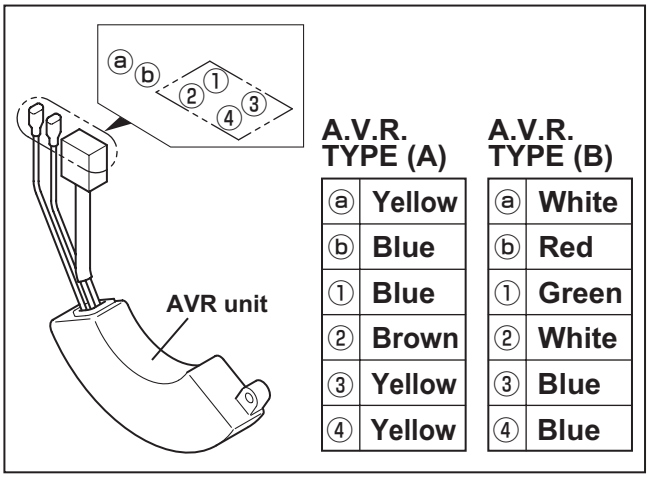


(a) A.V.R. TROUBLE IDENTIFICATION by APPEARANCE
If an A.V.R. electronic part is burnt dark, or the surface epoxy resin melted, it often indicates A.V.R. trouble.

(b) IDENTIFYING A.V.R. TROUBLE by CHECKING INTER-LEAD RESISTANCE
Check the inter-lead resistance of the A.V.R. with a tester, referring to the following table. If the tester readings very greatly from the values specified in the table on next page, the A.V.R. is faulty.

NOTE : Take tester inaccuracy into account in reading the tester.

(c) IDENTIFYING A.V.R. TROUBLE by MOUNTING and OPERATING in THE GENERATOR
SCR or transistor damage cannot be detected by simply looking at the A.V.R. or checking the lead resistance. Check it by mounting the suspectedly faulty A.V.R. in a normal
generator, or mount a mormal A.V.R. in a generator which fails to generate voltage.



A.V.R. TYPE (A)	
ⓐ	Yellow
ⓑ	Blue
①	Blue
②	Brown
③	Yellow
④	Yellow

A.V.R. TYPE (B)	
ⓐ	White
ⓑ	Red
①	Green
②	White
③	Blue
④	Blue

*** Checking table for analogue circuit tester.**

(R±20%)

A.V.R. TYPE (A)		Apply black ⊖ needle of the circuit tester (Ω)					
		Yellow ⓐ	Blue ⓑ	Blue ①	Brown ②	Yellow ③	Yellow ④
Apply red ⊕ needle of the circuit tester	Yellow ⓐ	—	1.5M	∞	∞	3.8M	4.3M
	Blue ⓑ	3.9M	—	∞	∞	2.0M	2.1M
	Blue ①	∞	∞	—	4.1M	∞	∞
	Brown ②	∞	∞	3.4M	—	∞	∞
	Yellow ③	8.5M	1.7M	∞	∞	—	4.3M
	Yellow ④	8.5M	1.6M	∞	∞	4.2M	—

*** Checking table for analogue circuit tester.**

(R±20%)

A.V.R. TYPE (B)		Apply black ⊖ needle of the circuit tester					
		White ⓐ	Red ⓑ	Green ①	White ②	Blue ③	Blue ④
Apply red ⊕ needle of the circuit tester	White ⓐ	—	2.1M	5.0M	5.1M	4.6M	4.2M
	Red ⓑ	1.8M	—	2.1M	2.1M	1.9M	1.6M
	Green ①	4.4M	2.0M	—	4.9M	4.4M	4.1M
	White ②	4.6M	2.1M	5.1M	—	4.6M	4.2M
	Blue ③	4.0M	1.7M	4.5M	4.5M	—	3.8M
	Blue ④	4.2M	1.8M	4.7M	4.7M	4.2M	—

6-7 DIODE STACK

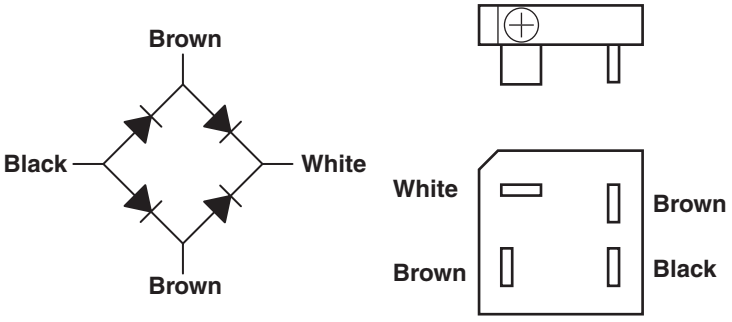


Fig.6-8a

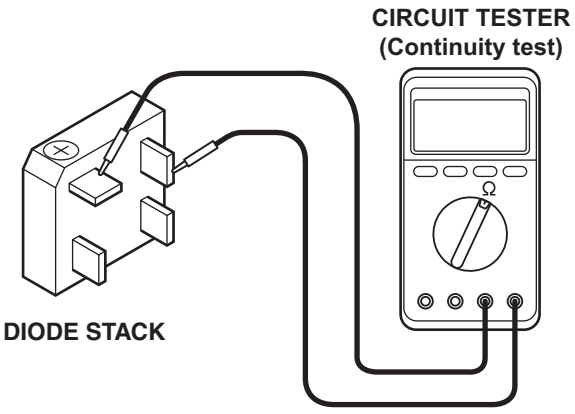


Fig.6-8b

Circuit inside of the diode stack is as shown in Fig.6-8a.

Check continuity between each terminal by using a circuit tester as shown in Fig.6-8b.

The diode stack is normal when continuity is as follows:

*** Checking table for analogue circuit tester.**

Analogue circuit tester		Apply black ⊖ needle of the circuit tester			
		Brown	Brown	White	Black
Apply red ⊕ needle of the circuit tester	Brown	—	No continuity	Continuity	No continuity
	Brown	No continuity	—	Continuity	No continuity
	White	No continuity	No continuity	—	No continuity
	Black	Continuity	Continuity	Continuity	—

*** Checking table for digital circuit tester.**

Digital circuit tester		Apply red ⊕ needle of the circuit tester			
		Brown	Brown	White	Black
Apply black ⊖ needle of the circuit tester	Brown	—	No continuity	Continuity	No continuity
	Brown	No continuity	—	Continuity	No continuity
	White	No continuity	No continuity	—	No continuity
	Black	Continuity	Continuity	Continuity	—

NOTE 1 : In checking the diode , direction of connection is contrary to the ordinary case because of characteristics of the diode and battery incorporated in the tester.

NOTE 2 : "Continuity" means forward direction characteristics of the diode, and different from short circuit condition (In which a pointer of the tester goes out of its normal scale), shows resistance to some extent. When results of the checking indicates failure even in one section, replace with a new one.

6-8 OIL SENSOR

(1) Disconnect wires comming from the sensor at the connection.

(2) Loosen the sensor to remove it from the engine.

(3) Plug the opening of oil filler hole (created after sensor is removed) with suitable means such as oil gauge.

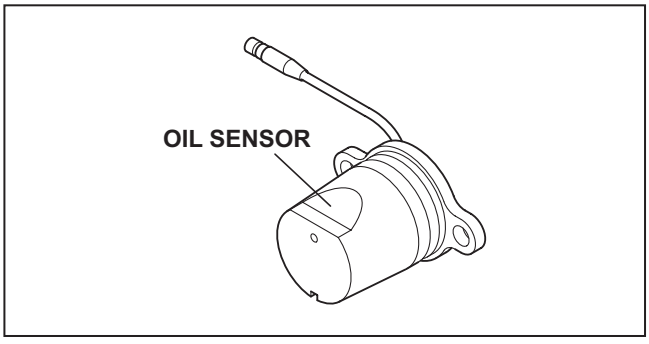
(4) Connect the removed wires again with the oil sensor.

(5) Start the engine with the oil sensor removed and confirm if ;
   a. Engine stops after 5 seconds which is normal, or
   b. Engine does not stop after more than 10 seconds which is unusual.

NOTE : The sensor will not operate properly when wire is broken or poorly connected. Check the wires for correct connection. If it fails to stop within 5 seconds after the wirings have checked, the sensor is wrong. Replace the sensor with new one.

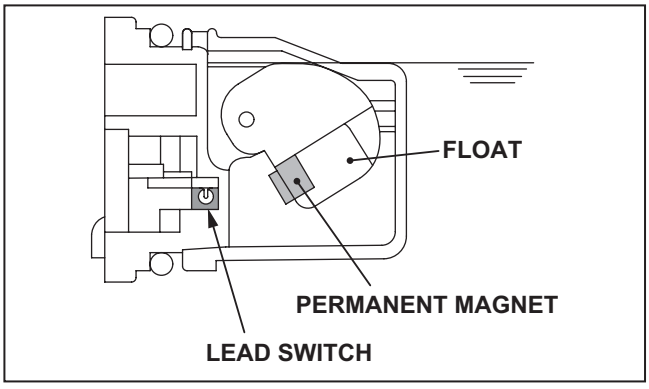
6-8-1 SPECIFICATIONS

Type	Float type (with lead switch incorporated)
Resistance (at FULL oil level)	100 M ohms or over
Operating Temperature	-30 to +180 degree Celsius

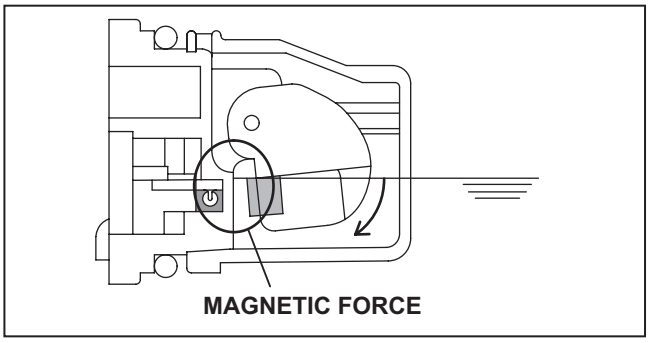


6-8-2 CONSTRUCTION AND OPERATION

Disconnect wires comming from the sensor The oil sensor is composed of the float, permanent magnet incorporated into the float and the oil sensor.
In accordance with the oil level, the float moves up and down.
When the oil level is upper level, the float moves up.



When the oil level is lower level, the float moves down.
The permanent magnet is close to the lead switch, and the lead switch is activated by the magnetic force.



NOTE : With regards to the wiring diagram, please refer to the section 9 (page52).

7. DISASSEMBLY AND ASSEMBLY

7-1 PREPARATION and PRECAUTIONS

1) Be sure to memorize the location of individual parts when disassembling the generator so that the generator can be reassembled correctly. Tag the disassembled part with the necessary information to facilitate easier and smoother reassemble.
2) For more convenience, divide the parts into several groups and store them in boxes.
3) To prevent bolts and nuts from being misplaced or installed incorrectly, replace them temporarily to their original position.
4) Handle disassembled parts with care; clean them before reassemble using a neutral cleaning fluid.
5) Use all disassembly / assembly tools properly, and use the proper tool for each specific job.

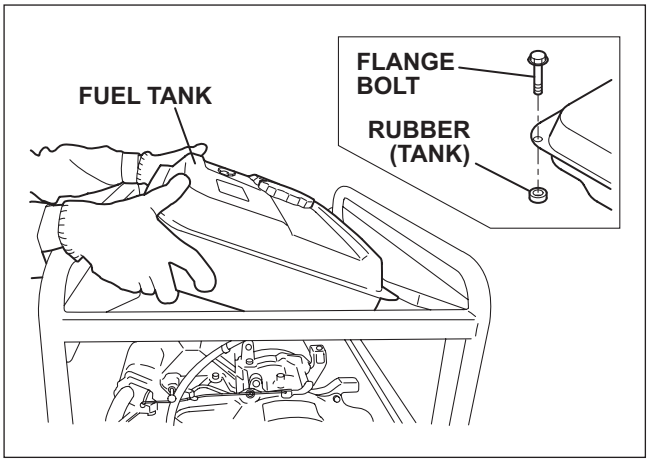
7-2 DISASSEMBLY PROCEDURES

7-2-1 FUEL TANK

(1) Shut the fuel strainer and discharge fuel from caburetor.

(2) Disconnect rubber pipe from the strainer.

(3) Remove the fuel tank.
M6 flange bolt . . . 4 pcs.
Rubber(tank) . . . 4 pcs.

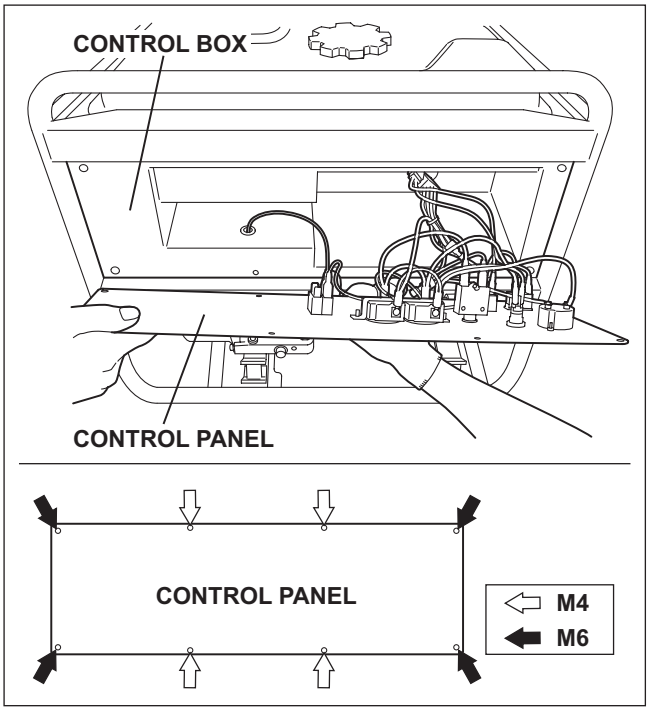


7-2-2 CONTROL PANEL and CONTROL BOX

(1) Remove the control panel.
M6 flange bolt . . . 4 pcs.
M4 flange bolt . . . 4 pcs.

(2) Disconnect the connectors on the wiring from the control panel to the alternator.

(3) Remove the control box.



7-2-3 ALTERNATOR

(1) Remove the end cover.
M6 flange bolt . . . 2 pcs.

(2) Disconnect the connectors on the wiring from the alternator.

(3) Remove the AVR unit, brush holder and diode stack.

(4) Set the generator set with the rear cover upwards.

NOTE) Before starting this work, make sure engine oil has been discharged.

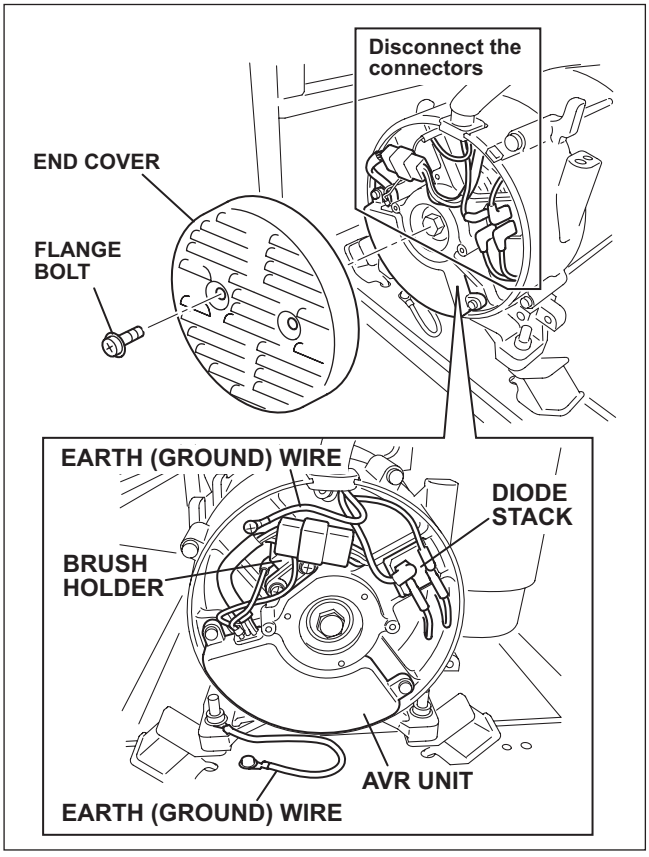
(5) Remove the two flange nuts fixing rear cover onto the mount rubbers.
M8 flange nut . . . 2 pcs.

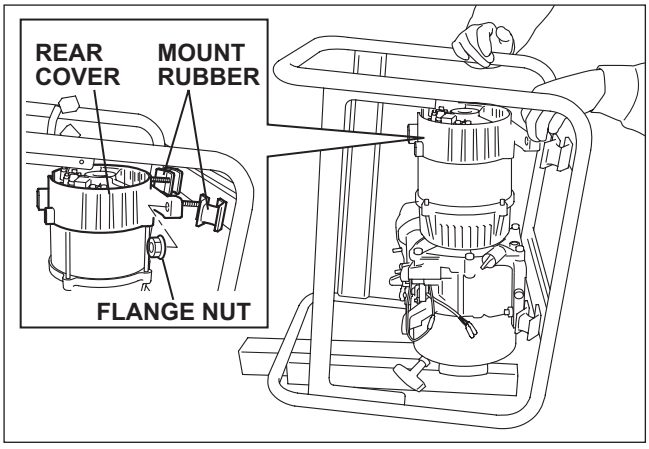
(6) Remove the rear cover.
RGX3000 M6 × 140mm . . . 3 pcs.
RGX3800 M6 × 165mm . . . 3 pcs.
RGX5100 M6 × 165mm . . . 4 pcs.

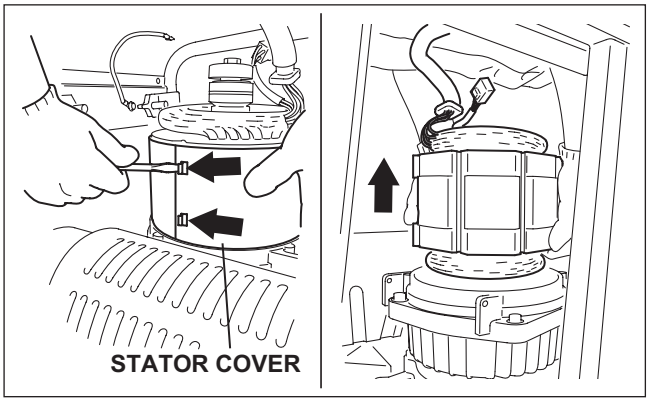
(7) Take out stator cover with claws (2 pcs) raised up by using screw driver.

(8) Remove the stator.

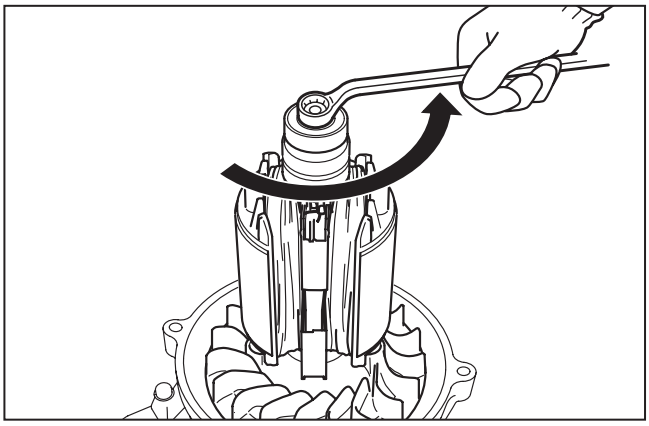
NOTE : The stator is heavy. Be careful do not hit the coil of the stator to the rotor.





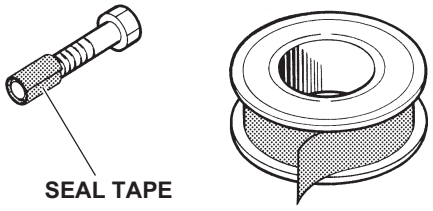


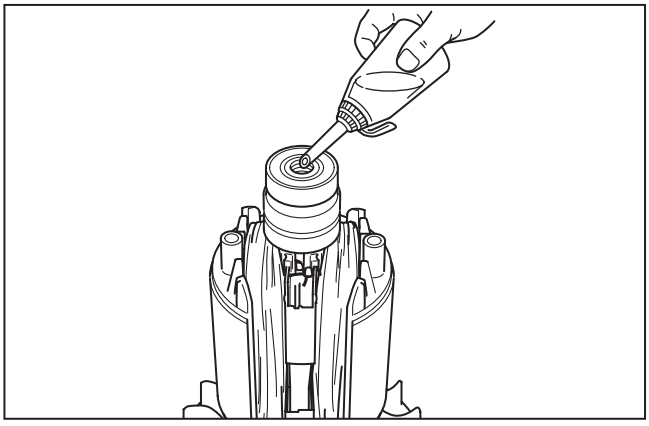
(9) Take off the through bolt of the rotor.



(10) Use a bolt and oil as a tool for pulling out rotor in the following procedures :

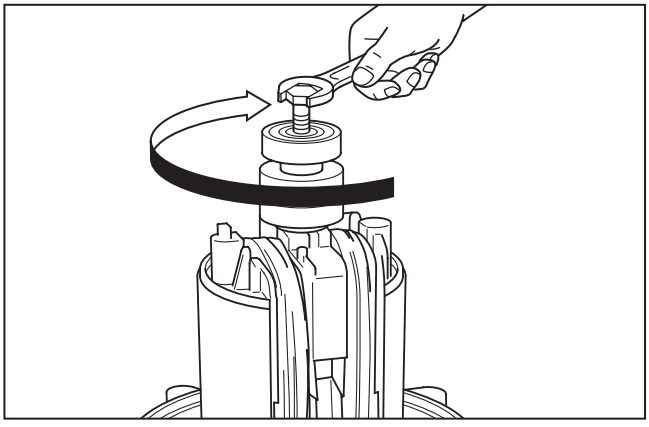
1. Pour engine oil into the center hole of rotor shaft. Fill with oil to the shaft end.
2. Prepare a bolt with the following thread size : M10 × 1.5 (RGX3000 / RGX3800)
   M12 × 1.75 (RGX5100)
3. Apply a few turns of seal tape around the tip of the bolt.



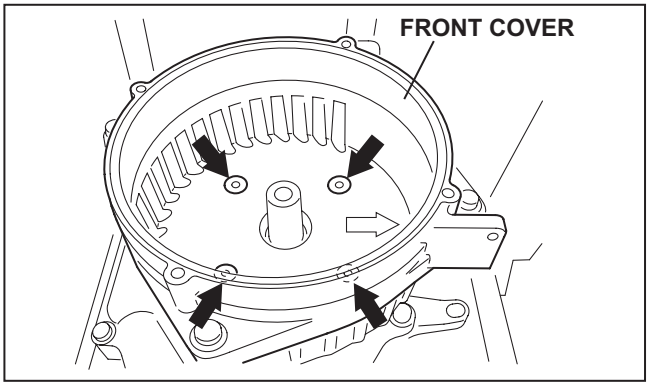


4. Screw the bolt into the thread of the rotor shaft.
5. Torque the bolt using a socket wrench until the rotor comes off loose.

* The hydraulic pressure inside the rotor shaft takes apart the rotor from the engine shaft.

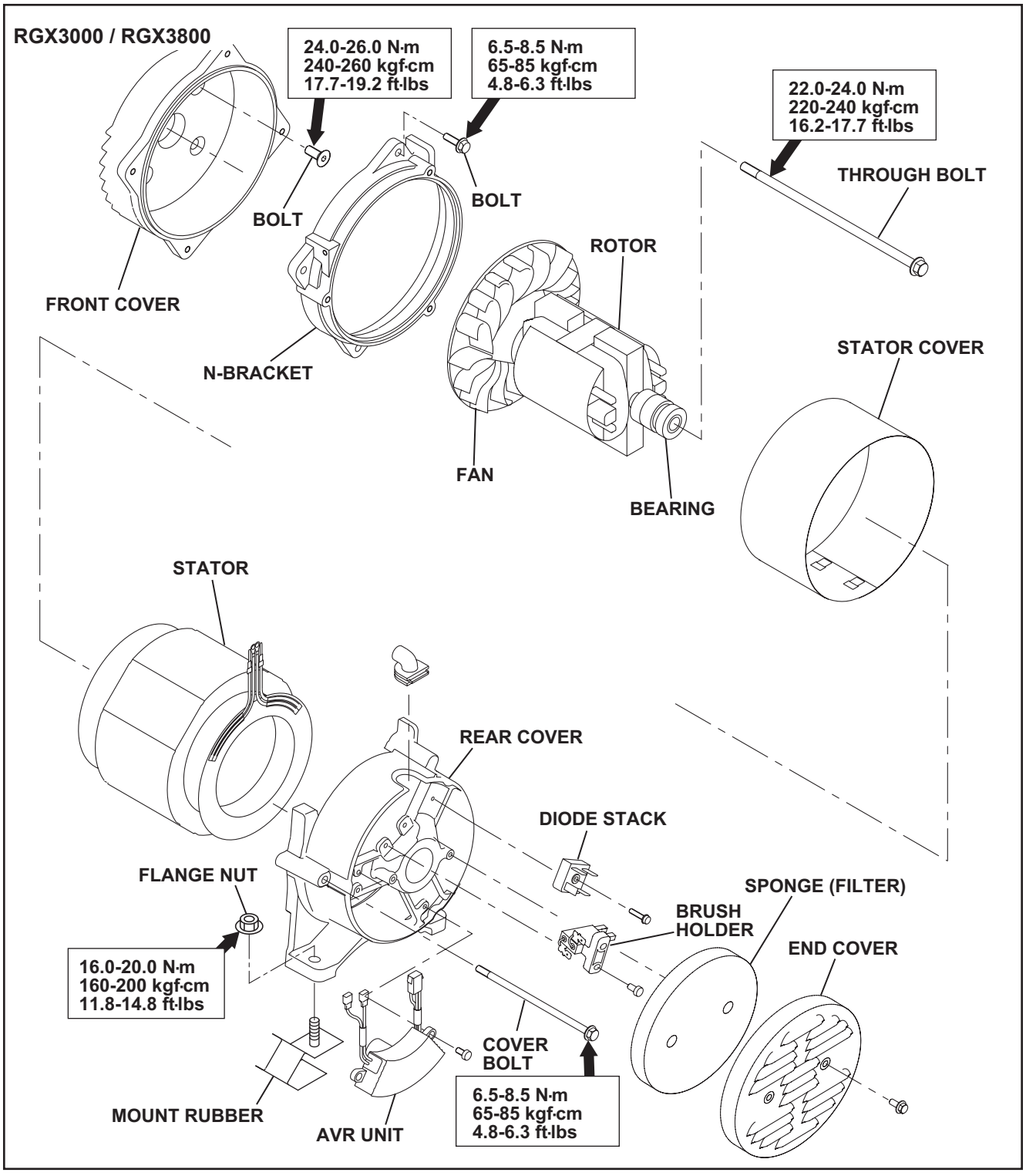


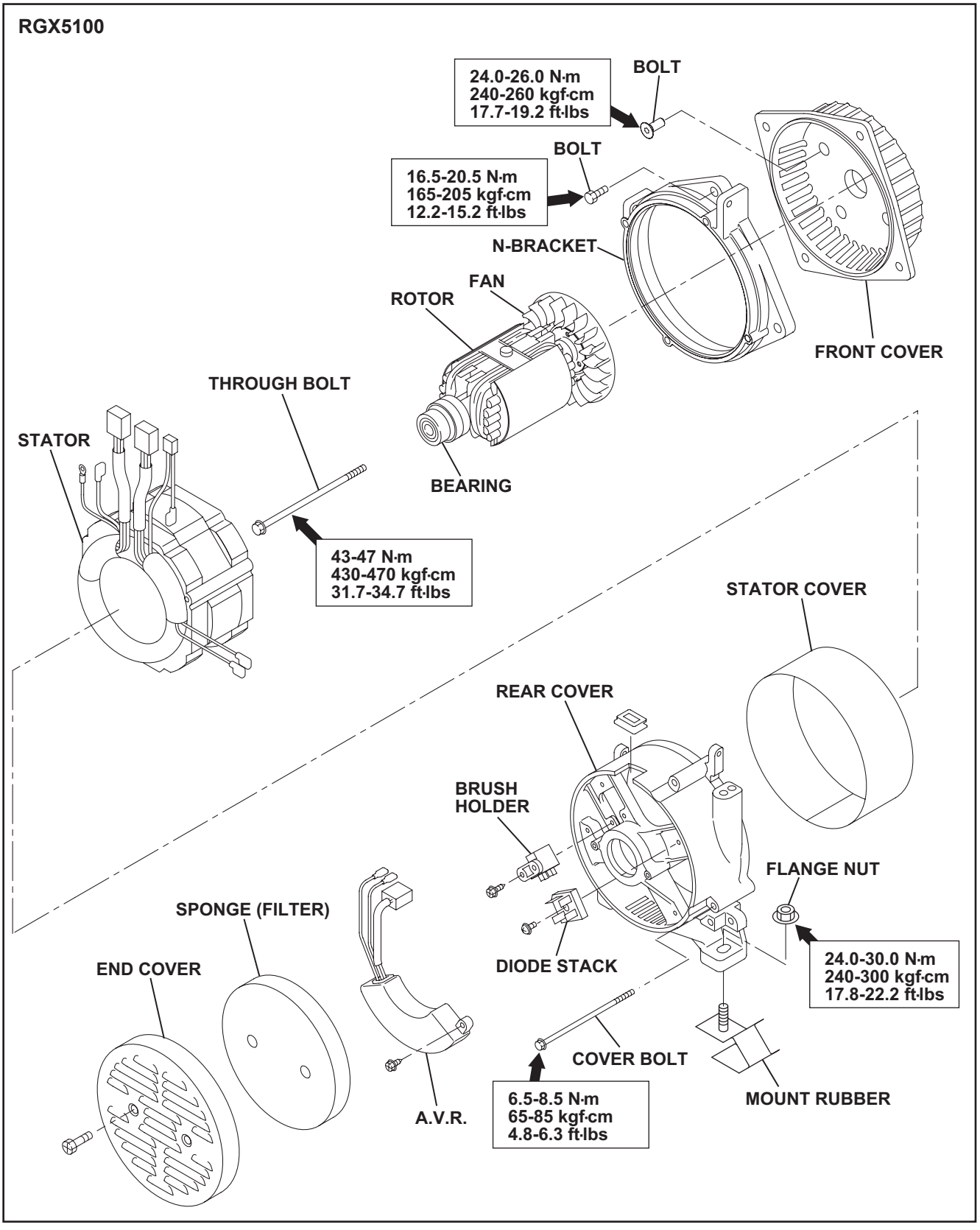
(11) Remove the front cover.
M8 × 20 bolt(countersunk head) . . . 4 pcs.



7-3 COMPONENT PARTS

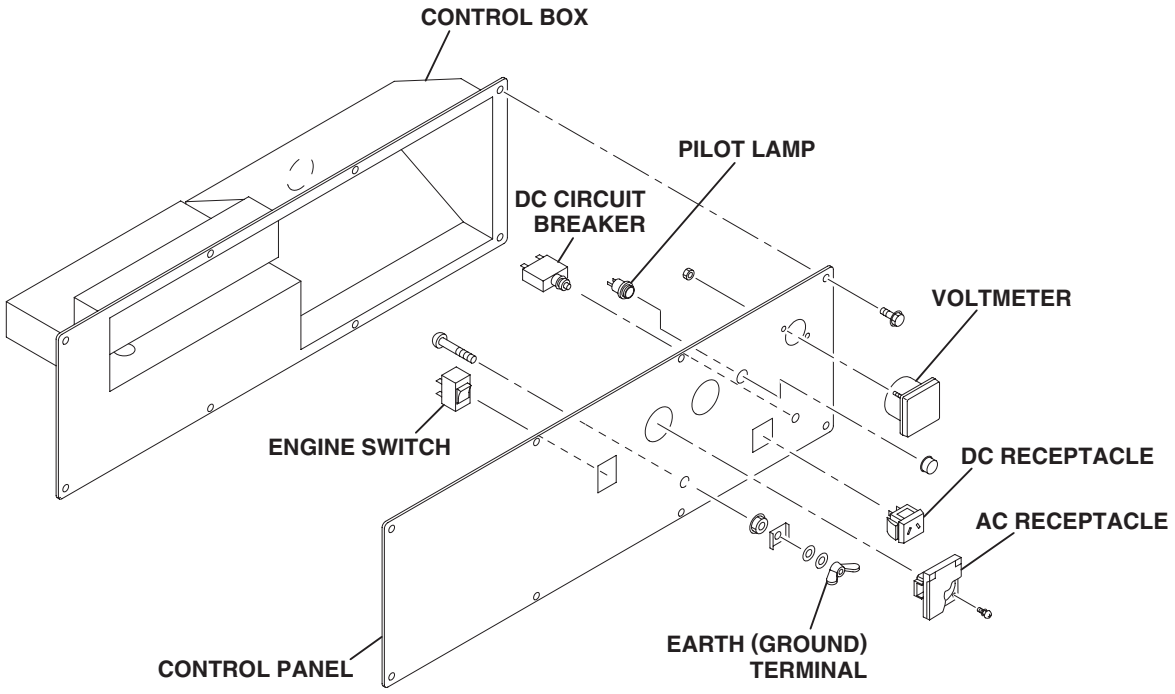
(1)Generator assembly




RGX5100
24.0-26.0 N·m
240-260 kgf·cm
17.7-19.2 ft·lbs
BOLT
BOLT
16.5-20.5 N·m
165-205 kgf·cm
12.2-15.2 ft·lbs
N-BRACKET
FAN
ROTOR
FRONT COVER
THROUGH BOLT
STATOR
BEARING
43-47 N·m
430-470 kgf·cm
31.7-34.7 ft·lbs
STATOR COVER
REAR COVER
BRUSH
HOLDER
FLANGE NUT
SPONGE (FILTER)
END COVER
DIODE STACK
24.0-30.0 N·m
240-300 kgf·cm
17.8-22.2 ft·lbs
COVER BOLT
MOUNT RUBBER
A.V.R.
6.5-8.5 N·m
65-85 kgf·cm
4.8-6.3 ft·lbs

(2) Control Box Assy

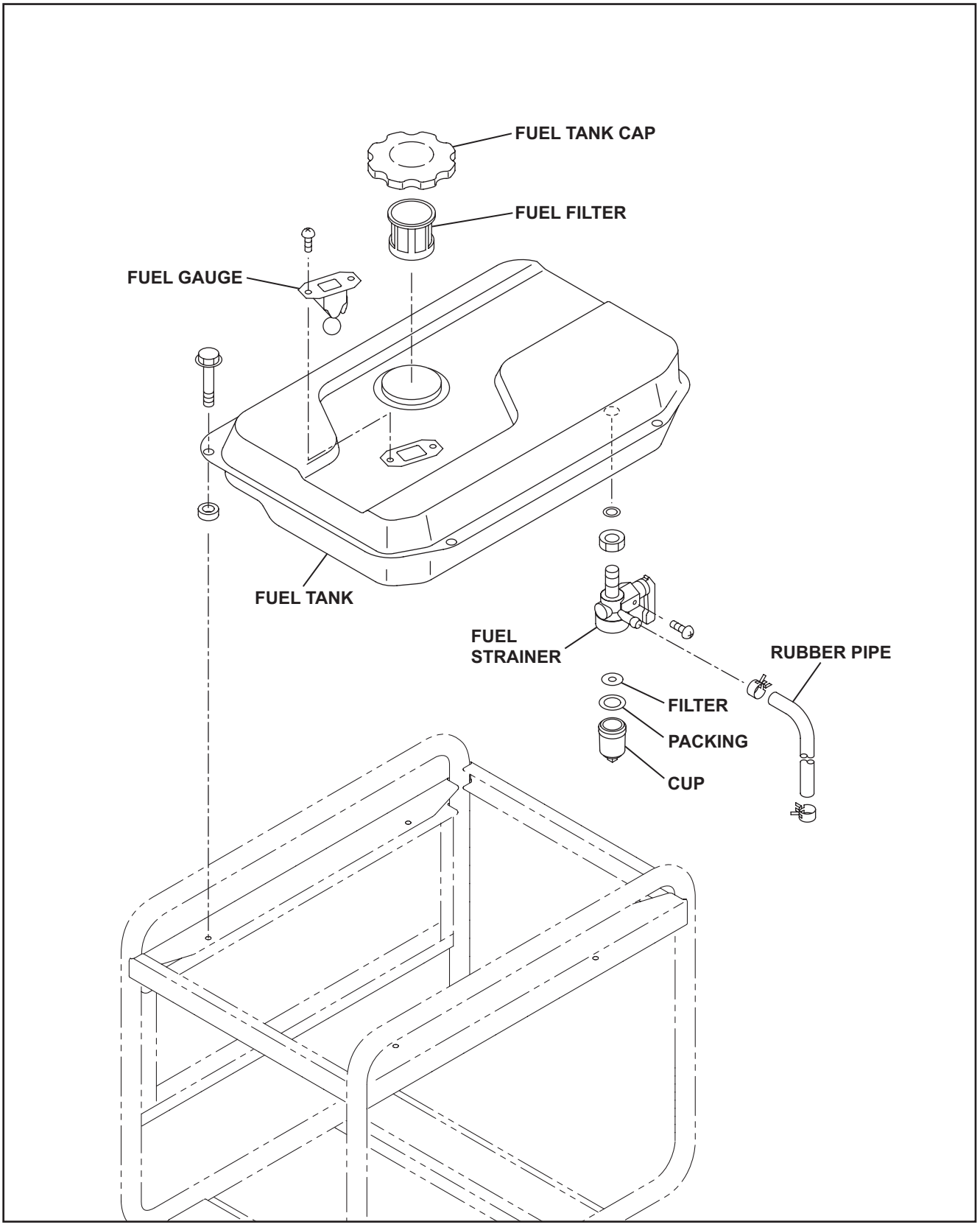
50Hz - 220V
240V



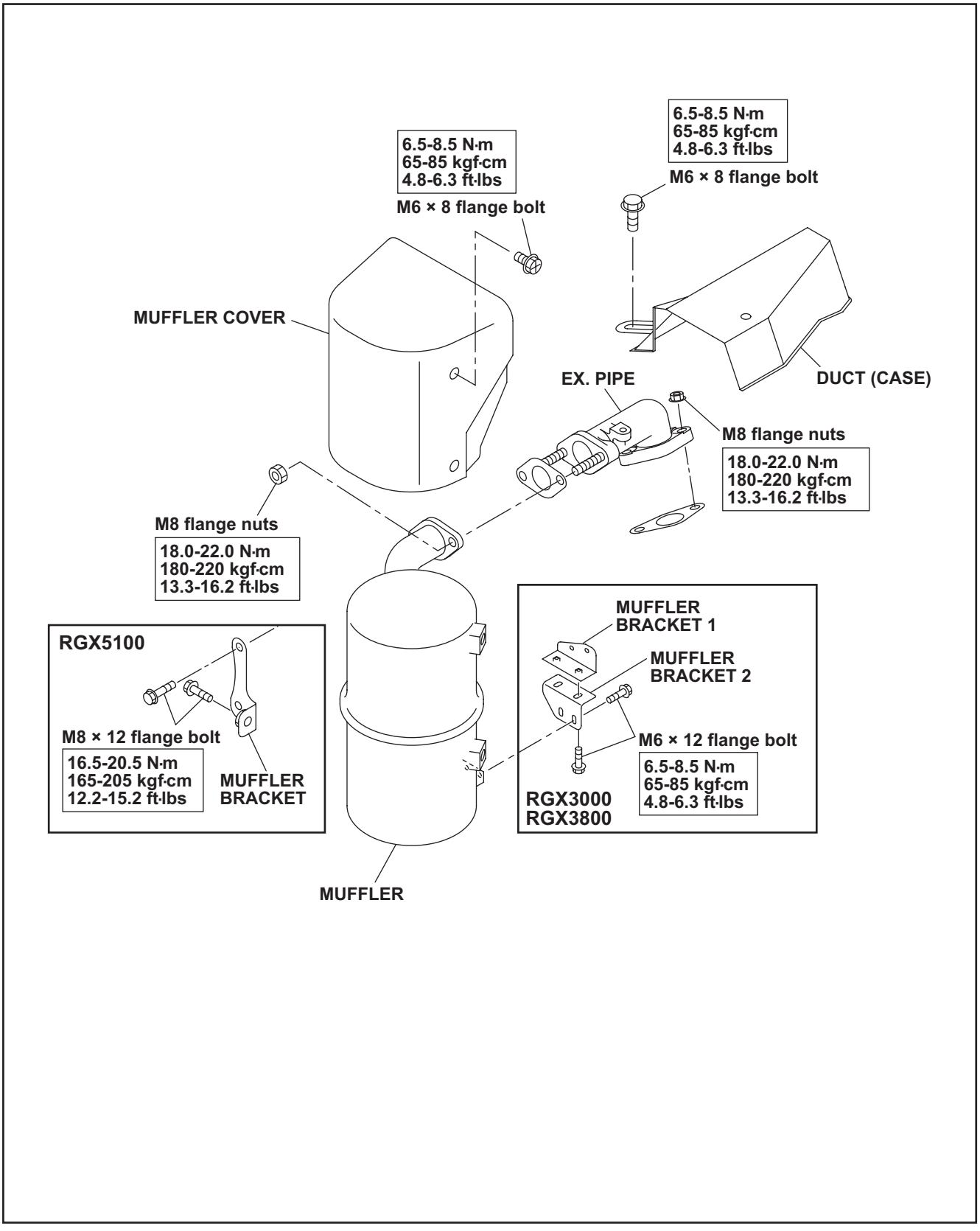
60Hz - 120V / 240V

N / A

(3) Fuel Tank


FUEL TANK CAP
FUEL FILTER
FUEL GAUGE
FUEL TANK
FUEL
STRAINER
RUBBER PIPE
FILTER
PACKING
CUP

(4) Muffler


6.5-8.5 N·m
65-85 kgf·cm
4.8-6.3 ft·lbs
M6 × 8 flange bolt
6.5-8.5 N·m
65-85 kgf·cm
4.8-6.3 ft·lbs
M6 × 8 flange bolt
MUFFLER COVER
DUCT (CASE)
EX. PIPE
M8 flange nuts
18.0-22.0 N·m
180-220 kgf·cm
13.3-16.2 ft·lbs
M8 flange nuts
18.0-22.0 N·m
180-220 kgf·cm
13.3-16.2 ft·lbs
RGX5100
M8 × 12 flange bolt
16.5-20.5 N·m
165-205 kgf·cm
12.2-15.2 ft·lbs
MUFFLER BRACKET
MUFFLER BRACKET 1
MUFFLER BRACKET 2
M6 × 12 flange bolt
6.5-8.5 N·m
65-85 kgf·cm
4.8-6.3 ft·lbs
RGX3000
RGX3800
MUFFLER

7-4 ASSEMBLY PROCEDURES

7-4-1 ENGINE and FRAME

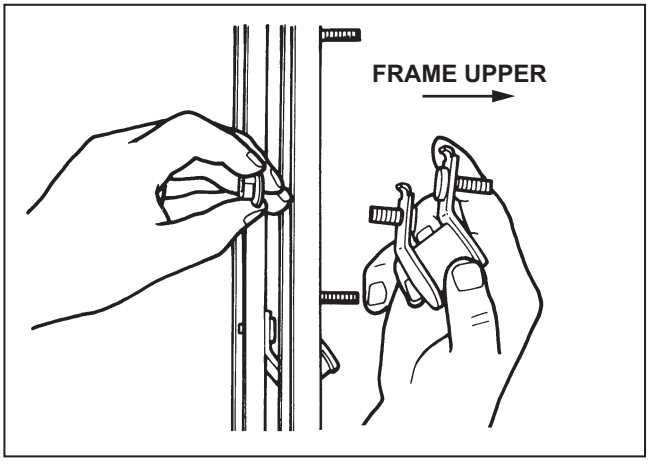
(1) Attach the mount rubbers to the frame. Insert the setting tongue of mount rubber into the hole on the frame and tighten the nut from the bottom of the frame.

RGX3000/RGX3800
M8 flange nut . . . 4 pcs.

Tightening torque :	**20.0-24.0 N•m**
	200-240 kgf•cm
	(14.8-17.8 ft•lbs)

RGX5100
M10 flange nut . . . 4 pcs.

Tightening torque :	**24.0-30.0 N•m**
	240-300 kgf•cm
	(17.8-22.2 ft•lbs)



NOTE : The mount rubbers are selected to reduce vibration most effectively by model.
Be sure to use the correct mount rubber for your generator.
Although mount rubbers have the same appearance, their characteristics are different.

(2) Install the engine into the frame from the side of it.
Tighten the nuts over the mount rubber bolts to fix.

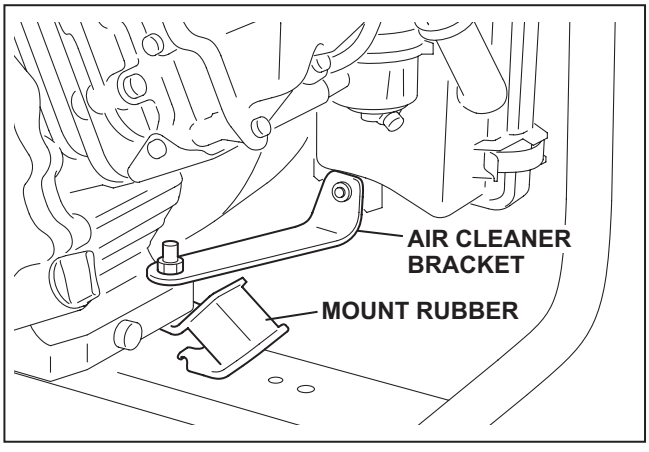
NOTE : Tighten nut together with air cleaner bracket in air cleaner side.

RGX3000/RGX3800
M8 flange nut . . . 2 pcs.

Tightening torque :	**16.0-20.0 N•m**
	160-200 kgf•cm
	(11.8-14.8 ft•lbs)

RGX5100
M10 flange nut . . . 2 pcs.

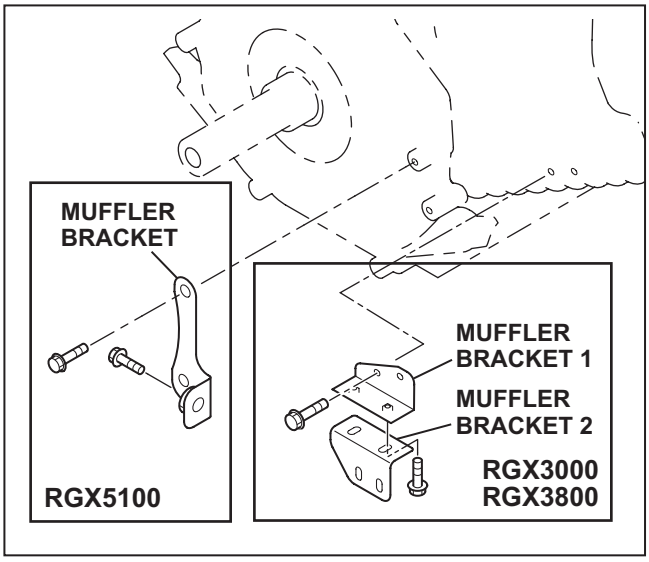
Tightening torque :	**24.0-30.0 N•m**
	240-300 kgf•cm
	(17.8-22.2 ft•lbs)



NOTE : Remove the air cleaner cover for easier installation.
NOTE : When tightening the nuts, slightly lift the engine so that the weight is not applied to the mount rubbers.

7-4-2 MUFFLER BRACKET

(1) Assemble the muffler bracket to engine.



RGX3000/RGX3800

Assemble muffler bracket 1 to cylinder head.

Temporally attach the muffler bracket 2 to the muffler bracket 1.

M6 × 12 flange bolt . . . 4 pcs.

Tightening torque :	**6.5-8.5**	**N•m**
	65-85	**kgf•cm**
	(4.8-6.3	**ft•lbs)**

RGX5100

Assemble muffler bracket to main bearing cover.

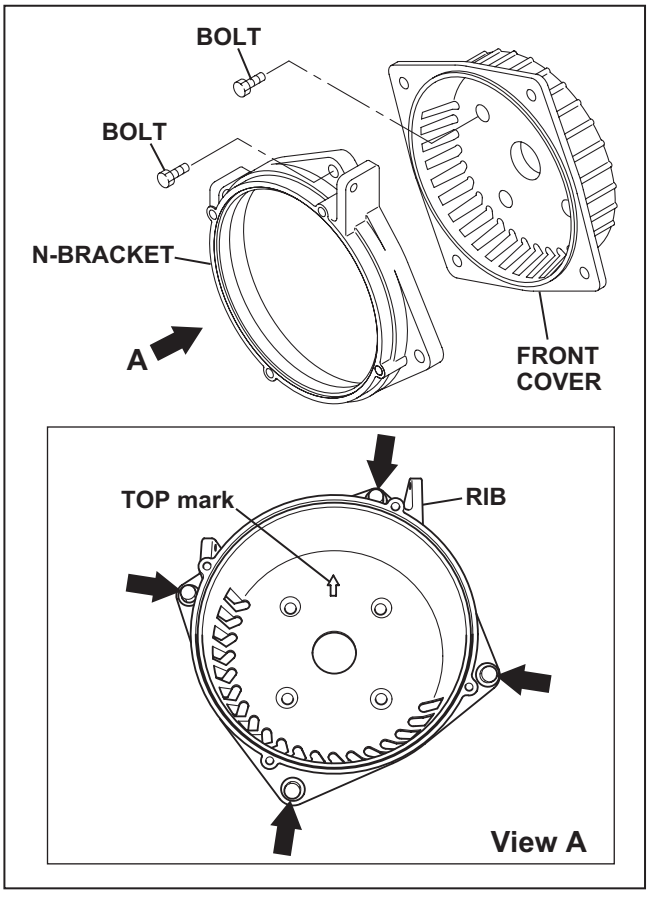
M8 × 12 flange bolt . . . 2 pcs.

Tightening torque :	**16.5-20.5**	**N•m**
	165-205	**kgf•cm**
	(12.2-15.2	**ft•lbs)**

7-4-3 FRONT COVER

(1) Attach the N-bracket onto the front cover.

NOTE : Match the rib direction on the N-bracket with the top mark on the front cover surface.



RGX3000/RGX3800

M6 × 20 flange bolt . . . 4 pcs.

Tightening torque :	**6.5-8.5**	**N•m**
	65-85	**kgf•cm**
	(4.8-6.3	**ft•lbs)**

RGX5100

M8 × 20 flange bolt . . . 4 pcs.

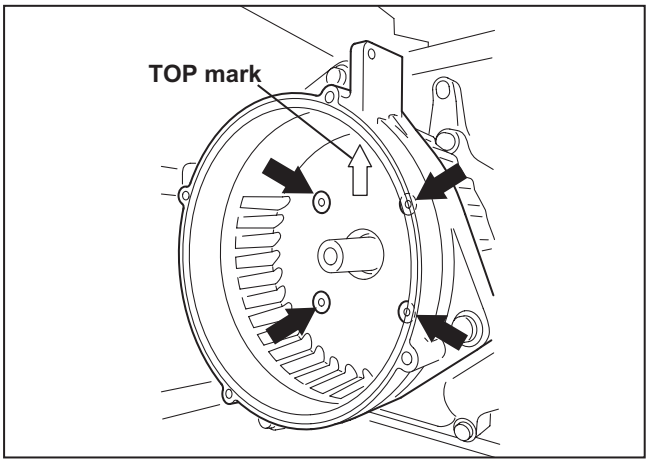
Tightening torque :	**16.5-20.5**	**N•m**
	165-205	**kgf•cm**
	(12.2-15.2	**ft•lbs)**

(2) Attach the front cover to the engine main bearing cover.

NOTE : Match the top mark on the front cover surface with upside direction.

M8 × 20 bolt(countersunk head) . . . 4 pcs.

Tightening torque :	**24.0-26.0 N•m** **240-260 kgf•cm** **(17.8-19.2 ft•lbs)**



7-4-4 ROTOR

(1) Wipe off oil, grease and dust from the tapered portion of engine shaft and matching tapered hole of rotor shaft.

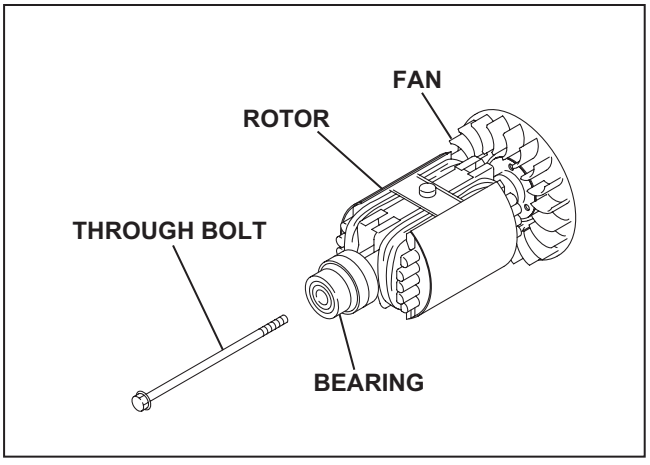
(2) Mount the rotor to the engine shaft. Tighten the through bolt.

RGX3000 : M8 × 222 flange bolt . . . 1 pc.
RGX3800 : M8 × 235 flange bolt . . . 1 pc.

Tightening torque :	**22.0-24.0 N•m** **220-240 kgf•cm** **(16.3-17.8 ft•lbs)**

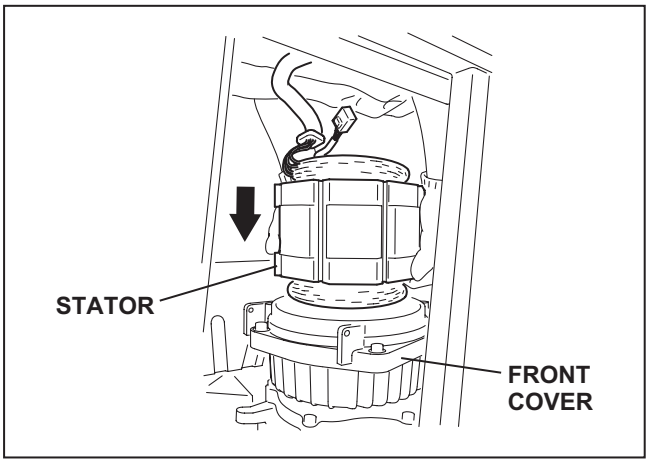
RGX5100 : M10 × 260 flange bolt . . . 1 pc.

Tightening torque :	**43.0-47.0 N•m** **430-470 kgf•cm** **(31.8-34.8 ft•lbs)**



7-4-5 STATOR

(1) Put the stator in the front cover.

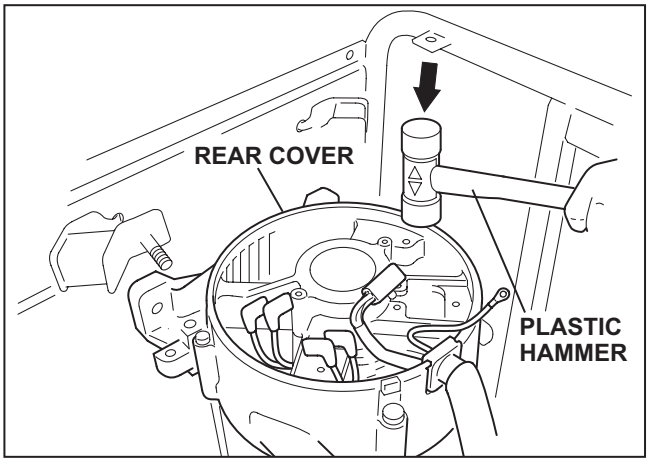


7-4-6 REAR COVER

(1)Put the rear cover over the rotor.
Pull out the stator wirings through the opening of the rear cover.

NOTE : Be careful not to give cuts to wires when pulling them out from the rear cover.

(2)Tap on the rear cover evenly with a plastic hammer to press the rotor bearing into the rear cover.

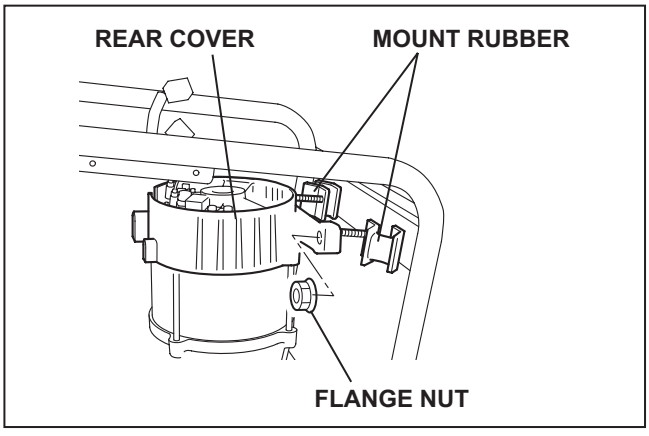


(3) Fix the rear cover with bolts.

NOTE : Tighten the bolts evenly and in turns.

RGX3000 : M6 × 140 flange bolt . . . 3 pcs.
RGX3800 : M6 × 165 flange bolt . . . 3 pcs.
RGX5100 : M6 × 165 flange bolt . . . 4 pcs.

Tightening torque :	**6.5-8.5**	**N•m**
	65-85	**kgf•cm**
	(4.8-6.3	**ft•lbs)**



(4) Set the mount rubber bolts into the rear cover holes.
Do not tighten the nut at this moment.

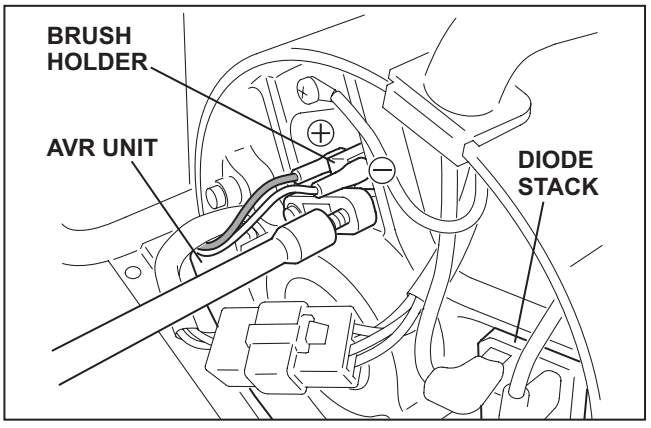
(5) Install the brush holder, AVR unit and diode stack in the rear cover.

M5 × 16 bolt . . . 2 pcs. (AVR unit)

Tightening torque :	**4.0-4.5**	**N•m**
	40-45	**kgf•cm**
	(3.0-3.3	**ft•lbs)**

M5 × 16 bolt . . . 2 pcs. (brush holder)
M4 × 18 bolt . . . 1 pc. (diode stack)

Tightening torque :	**1.5-2.0**	**N•m**
	15-20	**kgf•cm**
	(1.1-1.5	**ft•lbs)**



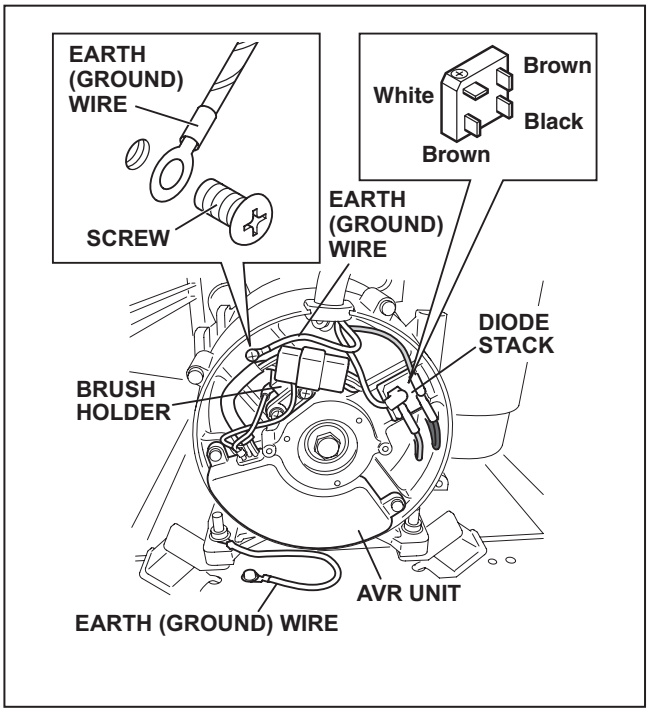
	Wiring color	
	Plus ⊕	**Minus ⊖**
A.V.R. type (A)	Blue	Yellow
A.V.R. type (B)	Red	White

NOTE : If the brush is installed oblique to the slip ring, there is possibility that the brush holder can break when the screw is tightened : or the brush may break when generator of started. Make this process carefully.

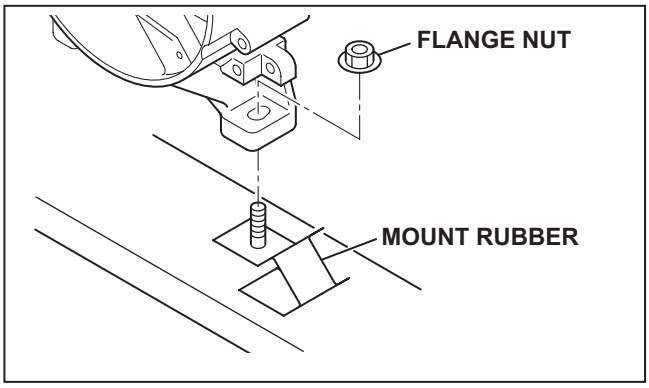
(6) Attach the connectors to the brush holder, AVR unit and diode stack.

(7) Connect the earth (ground) wire (green/yellow) with the rear cover with screw.

(8) Connect earth (ground) wire between frame and rear cover.
On frame side: M6 × 12 bolt . . . 1 pc.
On rear cover side: 8mm nut
(commonly tighten the mount rubber bolt)



(9) Tighten the nuts over the mount rubber bolts to fix.



NOTE : When tightening the nuts, slightly lift the alternator assembly so that the weight is not applied to the mount rubbers.

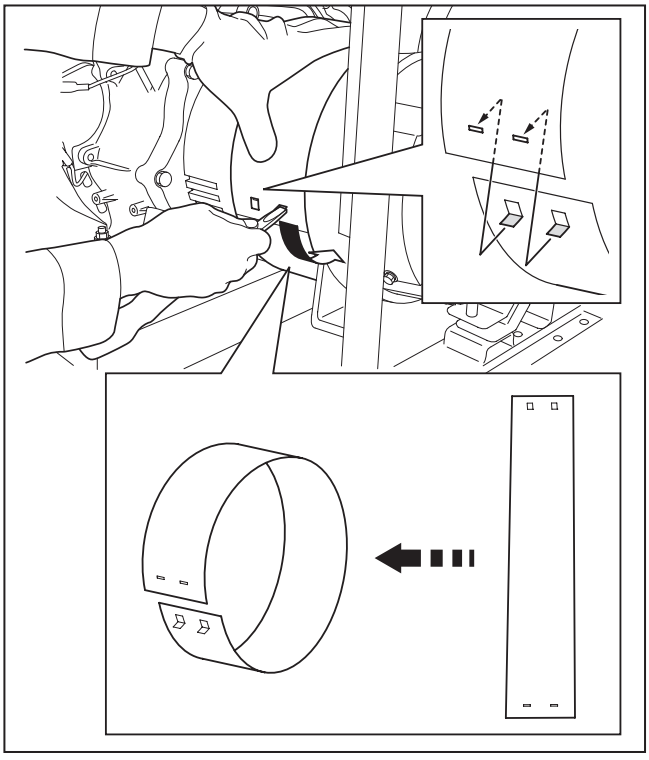
RGX3000/RGX3800
M8 flange nut . . . 2 pcs.

Tightening torque :	**16.0-20.0 N•m** **160-200 kgf•cm** **(11.8-14.8 ft•lbs)**

RGX5100
M10 flange nut . . . 2 pcs.

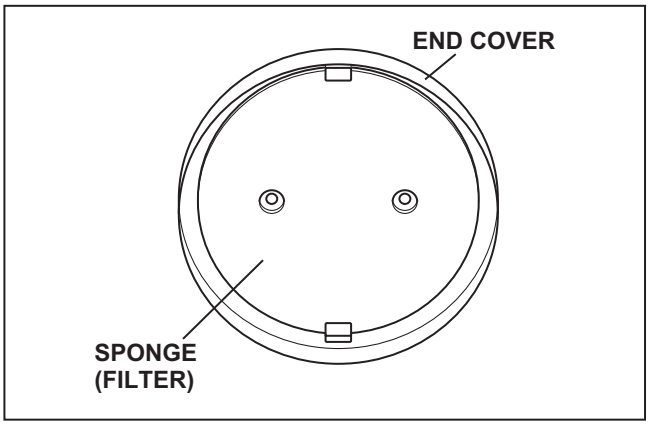
Tightening torque :	**24.0-30.0 N•m** **240-300 kgf•cm** **(17.8-22.2 ft•lbs)**

(10) Set stator cover with the crow inserted into slit and bent (2 pcs).



(11) Set the Sponge(Filter) to inside of End Cover.

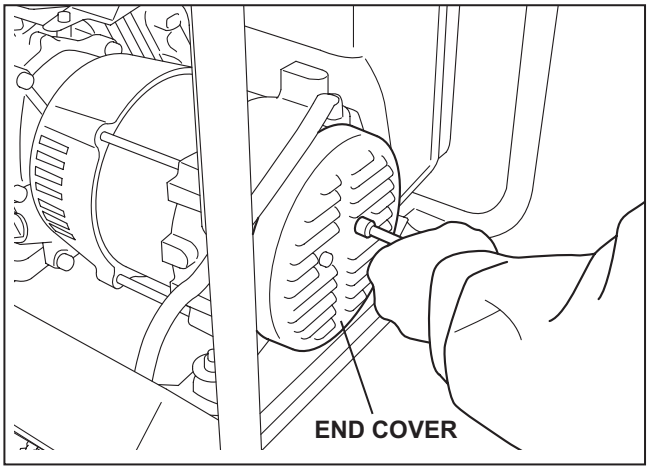
NOTE : Hold the Sponge by tab of End Cover.



(12) Attach the end cover to the rear cover.

M5 × 16 bolt . . . 2 pcs.

Tightening torque :	**4.0-4.5**	**N•m**
	40-45	**kgf•cm**
	(3.0-3.3	**ft•lbs)**

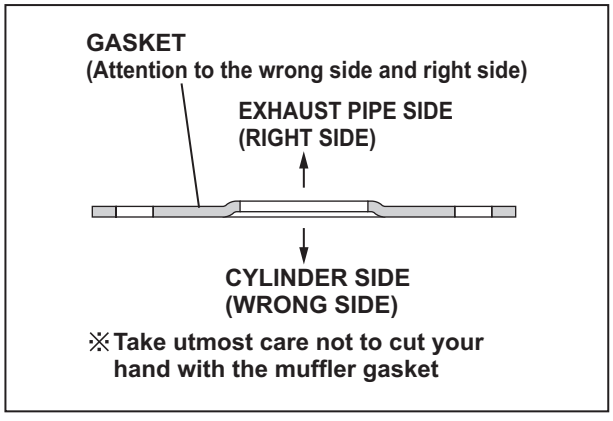


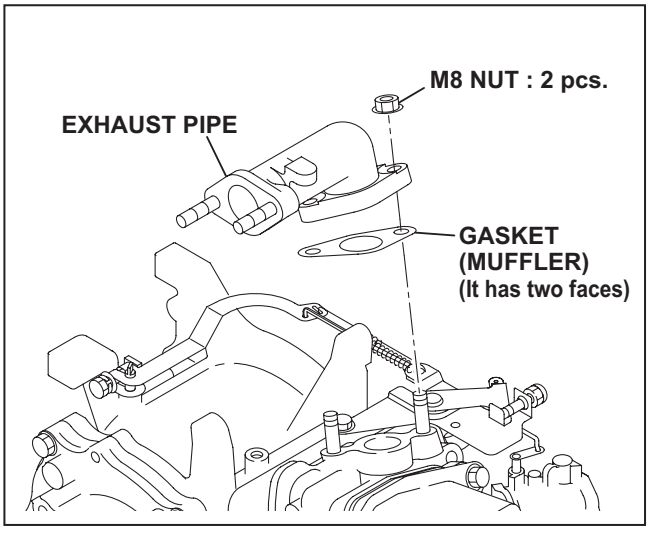
7-4-7 MUFFLER and MUFFLER COVER

(1) Mount the Exhaust pipe and the gasket on the cylinder head.

M8 flange nut (sus) . . . 2 pcs.

Tightening torque :	**18.0-22.0**	**N•m**
	180-220	**kgf•cm**
	(13.3-16.2	**ft•lbs)**


GASKET
(Attention to the wrong side and right side)
EXHAUST PIPE SIDE
(RIGHT SIDE)
CYLINDER SIDE
(WRONG SIDE)
※Take utmost care not to cut your hand with the muffler gasket



(2) Attach the muffler to the exhaust pipe and muffler bracket without tightening.

(3) Tightening the muffler to the exhaust pipe and bracket.

M8 flange nuts (sus) . . . 2 pcs. (exhaust pipe)

Tightening torque :	**18.0-22.0**	**N•m**
	180-220	**kgf•cm**
	(13.3-16.2	**ft•lbs)**

RGX3000/RGX3800

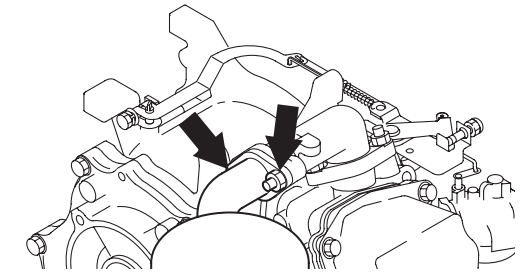
M6 × 12 flange bolt . . . 2 pcs. (bracket2)

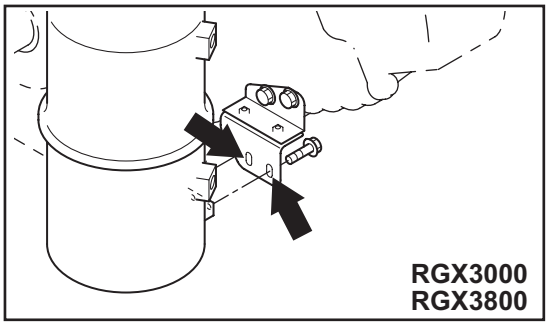
Tightening torque :	**6.5-8.5**	**N•m**
	65-85	**kgf•cm**
	(4.8-6.3	**ft•lbs)**

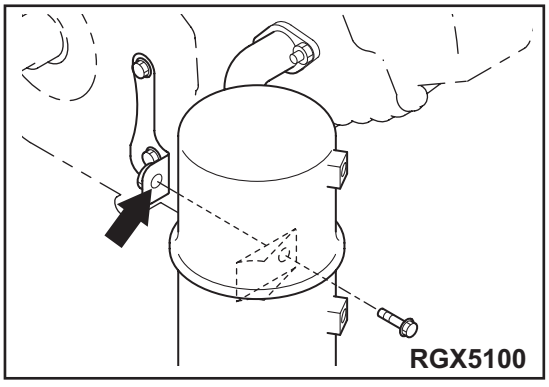
RGX5100

M8 × 12 flange bolt . . . 1 pc. (bracket)

Tightening torque :	**16.5-20.5**	**N•m**
	165-205	**kgf•cm**
	(12.2-15.2	**ft•lbs)**



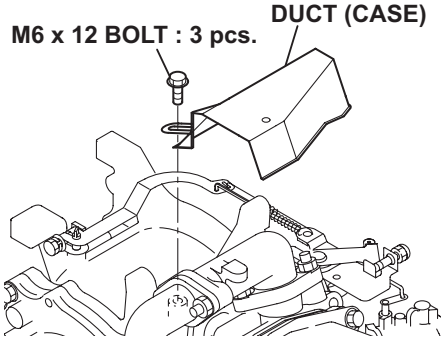


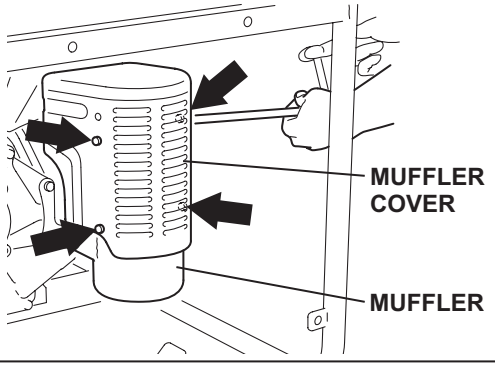


(4) Assemble the duct and the muffler cover.

M6 × 8 flange bolt . . . 7 pcs.

Tightening torque :	**6.5-8.5**	**N•m**
	65-85	**kgf•cm**
	(4.8-6.3	**ft•lbs)**





7-4-8 FUEL TANK

(1) Hand tighten the strainer screw as far as it will go, loosen it again by one or two rotations (fuel outlet faces down), then tighten the lock nut.

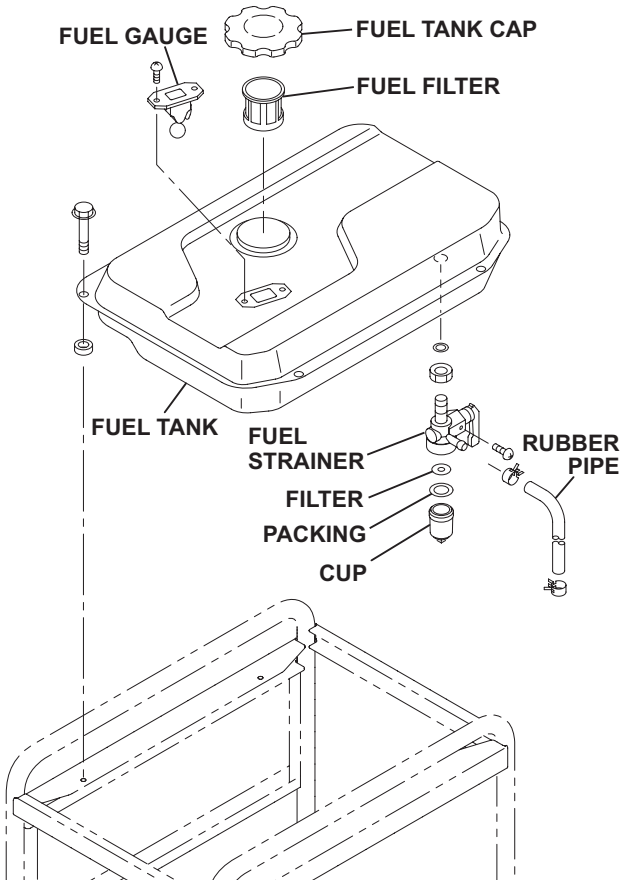
(2) Mount the fuel tank on the frame with rubber washers between the tank flange and the frame.

M6 x 20 mm bolt (black) . . . 4 pcs.
Rubber washer . . . 4 pcs.

NOTE : For easy tank assembly, glue the rubber washers over the mounting holes of the frame.

(3) Connect the rubber pipe.
First, fit the hose clamps on the rubber pipe and connect it to the strainer and the carburetor. Then fasten it with the hose clamps.

NOTE : Apply a drop of oil to the rubber pipe for easier connection.



7-4-9 CONTROL BOX ASSY

Refer to Section 7-5 for disassembly, checking and reassembly procedures of the control panel.

(1) Put the cover onto the frame temporary.

NOTE : Don't set bolt for the control box.

(2) Pass wires drawn out generator and engine to the control box.

(3) Connect the wires coming from the control panel with wires coming from generator and engine.

NOTE : Connect the wires of the same color.

(4) Install the control panel onto the control box.

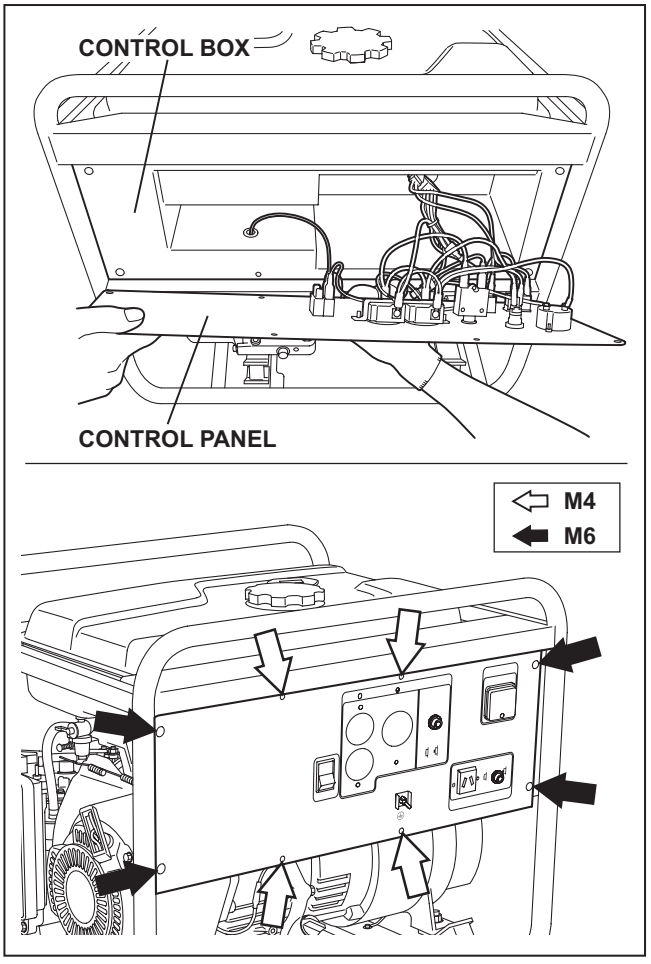
M4 × 12 mm Screw . . . 4 pcs.

Tightening torque :	**1.5-2.0**	**N•m**
	15-20	**kgf•cm**
	(1.1-1.5	**ft•lbs)**

(5) Mount the control panel together with the control box (Control box Assembly) onto the frame.

M6 × 12 mm Screw . . . 4 pcs.

Tightening torque :	**5.0-6.0**	**N•m**
	50-60	**kgf•cm**
	(3.7-4.8	**ft•lbs)**



7-5 CHECKING, DISASSEMBLY and REASSEMBLY of the CONTROL PANEL

7-5-1 CHECKING OF THE CONTROL PANEL

Dismount the control box assy from frame. Remove the control box from control panel and check each components and wiring. Refer to Section 6 for the detail of checking procedure for the components in the front panel.

7-5-2 DISASSEMBLY

(1) Remove the control panel from the control box.

(2) Disconnect the connectors on the wires to detach the control panel.

(3) After disconnecting individual wires, remove the control panel components.

NOTE : Full power switch have their wires soldered. Unsolder them to remove those parts if necessary.

7-5-3 REASSEMBLY

(1) Install the receptacles, circuit breakers, terminals, switches, etc. on the control panel and wire them.

NOTE : Circuit diagrams are shown in Section 9. Colored wires are used for easy identification, and are of the correct capacity and size. Use heat-resistant type wires (permissible temperature range 75°C or over) in the specified gauge shown in the circuit diagrams.

(2) Connect the wires of control panel components.

(3) Attach the control panel and control box to the Frame.
(Refer to 7-4-9 for details.)

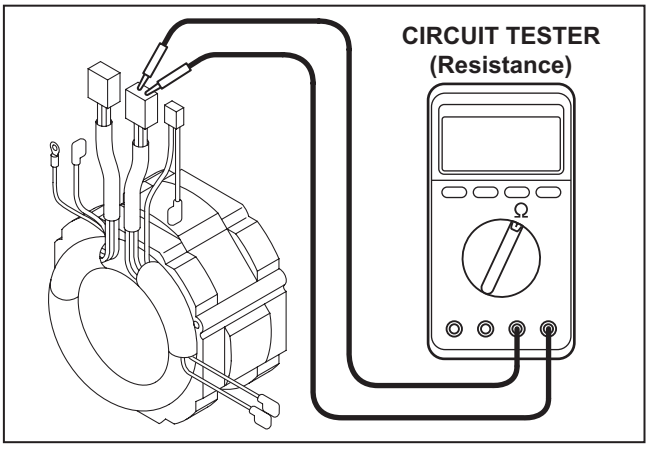
8. TROUBLESHOOTING

8-1 NO AC OUTPUT

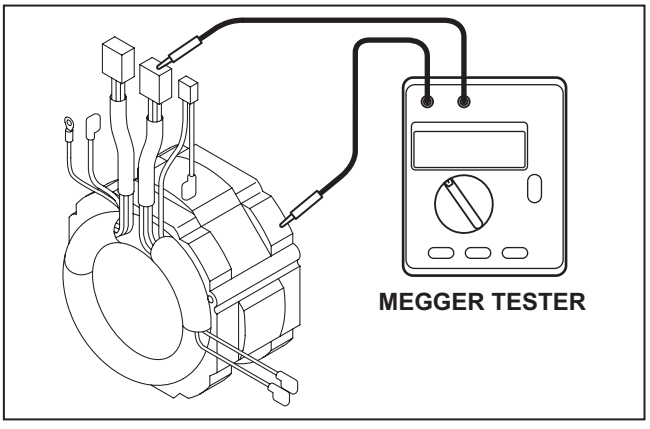
8-1-1 CHECKING STATOR

(1) Remove control panel and disconnect stator wires at the connectors.

(2) Measure the resistance between terminals on stator leads.
Refer to Table of Section 6-4 STATOR for normal resistance.
If stator is faulty, replace it with a new one.



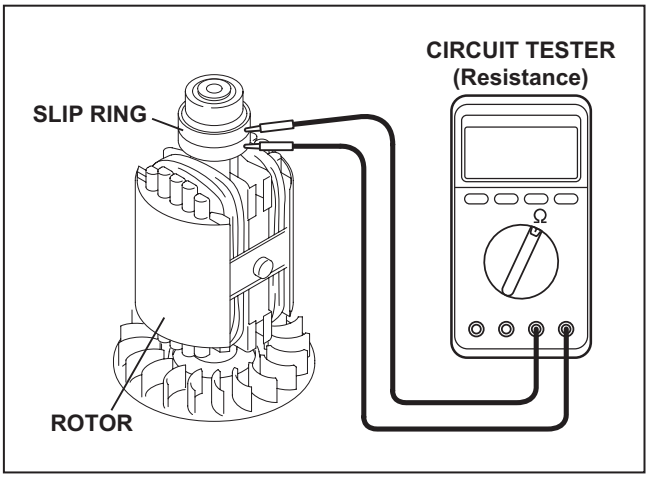
(3) Check the insulation resistance between stator core and each stator lead using a megger tester.
If insulation is bad, replace stator with a new one.



8-1-2 CHECKING ROTOR

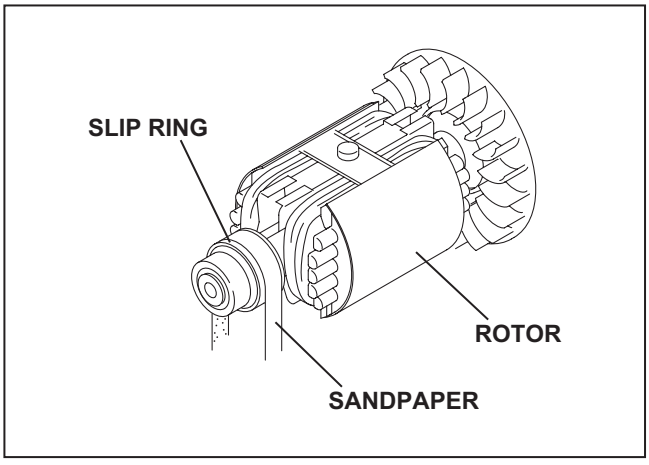
1) Field coil
Remove the brush holder and measure resistance between the slip rings. Refer to Section 6-5 ROTOR ASSEMBLY for normal resistance.

NOTE : If the circuit tester is not sufficiently accurate, it may not show the values given and may give erroneous readings. Erroneous reading will also occur when there is a wide variation of resistance among coil windings or when measurement is performed at ambient temperatures different from from 20°C (68°F).



2) Cleaning Slip rings

The slip ring surfaces must be uniformly bright. Slip rings showing black spots, excessive wear, or uneven wear must be repaired. A stained slip ring lowers generator efficiency and output voltage. Polish the slip rings with fine sandpaper while turning the rotor until rough spots disappear. Care should be taken not to touch the rotor coils with the sandpaper.



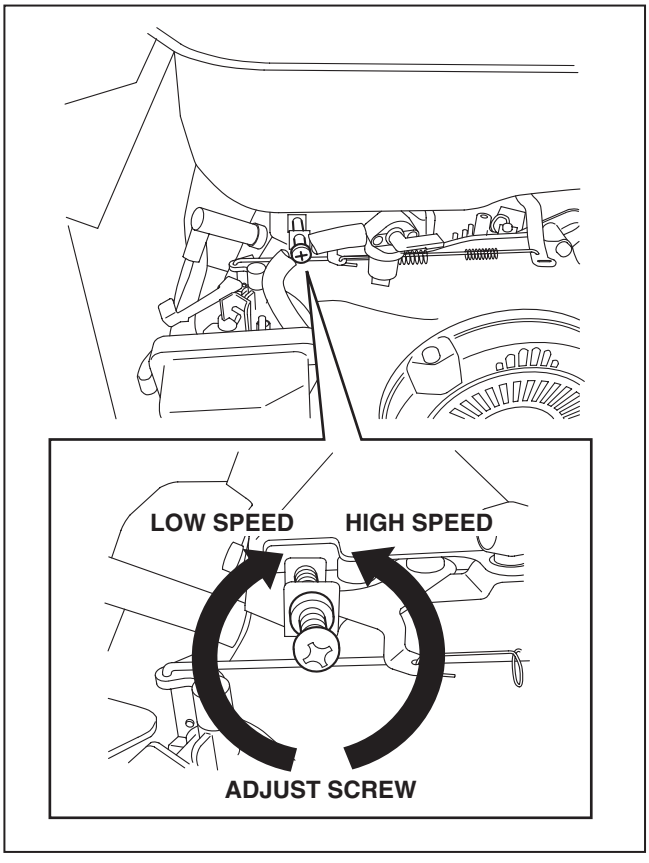
8-2 AC VOLTAGE IS TOO HIGH OR TOO LOW

8-2-1 CHECKING ENGINE SPEED

If the engine speed is too high or too low, adjust it to the rated r.p.m.

[How to adjust engine r.p.m.]

* Loosen the lock nut on the adjusting screw.
* Turn the adjusting screw clockwise to decrease engine speed or counterclockwise to increase engine speed.



Normal engine speed at no load :

3050 to 3250 rpm for 50Hz type
3650 to 3850 rpm for 60Hz type

8-2-2 CHECKING STATOR

Check stator referring to Step 8-1-1.

8-2-3 CHECKING ROTOR

Check rotor referring to Step 8-1-2.

8-3 AC VOLTAGE IS NORMAL AT NO-LOAD, BUT THE LOAD CANNOT BE APPLIED.

8-3-1 CHECK THE ENGINE SPEED.

If the engine speed is low, adjust it to the rated r.p.m.

*Refer to Step 8-2-1 for engine speed adjustment.

8-3-2 CHECK THE TOTAL WATTAGE OF APPLIANCES CONNECTED TO THE GENERATOR.

Refer to Section 4 “RANGE OF APPLICATIONS” for the wattage of the appliances.

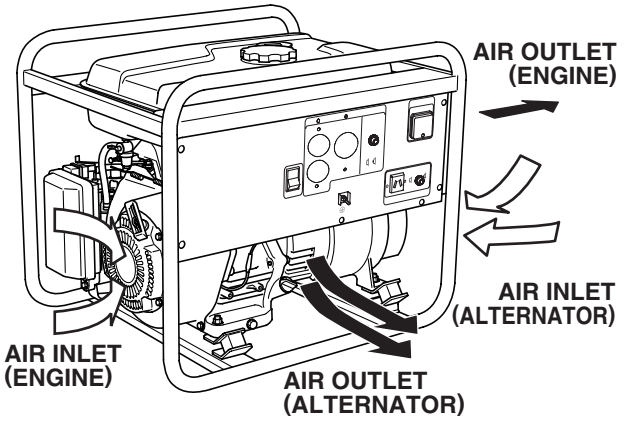
If the generator is overloaded, reduce the load to the rated output of the generator.

8-3-3 CHECK THE APPLIANCE FOR TROUBLE.

If the appliance is faulty, repair it.

8-3-4 CHECK IF THE ENGINE IS OVERHEATED.

If the cooling air inlet and/or cooling air outlet is clogged with dirt, grass, chaff or other debris, remove it.



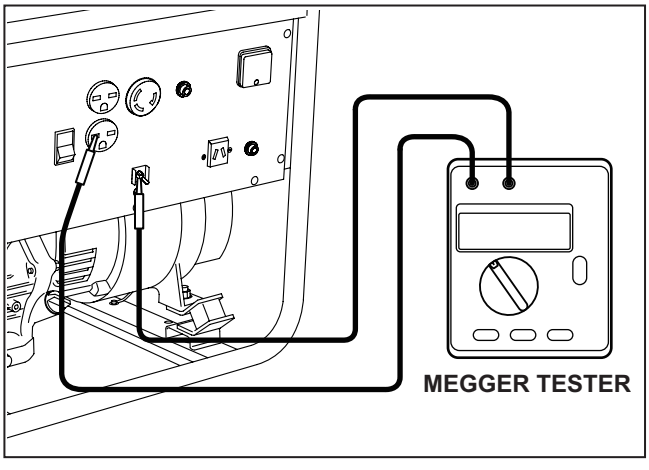
8-3-5 CHECK THE INSULATION OF THE GENERATOR.

(1) Stop the engine. Remove the control panel, and disconnect the connector of GREEN lead for ground.

(2) Measure the insulation resistance between the live terminal of the receptacle and the ground terminal.

If the insulation resistance is less than 1MΩ, disassemble the generator and check the insulation resistance of the stator, rotor and the live parts in the control box. (Refer to Section 5-4.)

Any part where the insulation resistance is less than 1MΩ, the insulation is faulty and may cause electric leakage.
Replace the faulty part.



8-4 NO DC OUTPUT

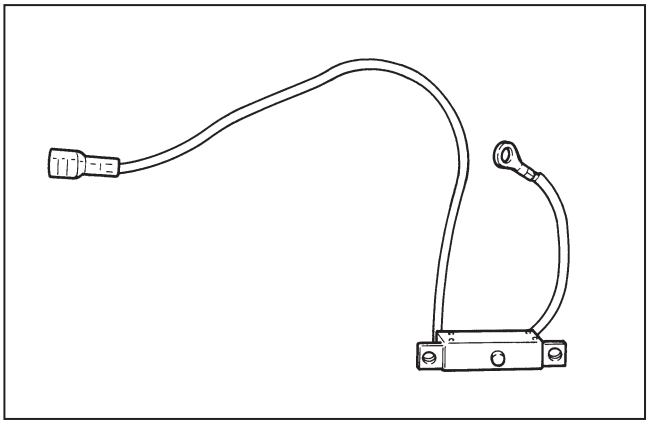
8-4-1 CHECK THE AC OUTPUT.

Check the generator by following Step 8-1-1 through Step 8-1-2.

8-4-2 CHECK THE DC BREAKER.

If the DC breaker turned off while charging a battery, check the cables for short-circuit or connection in reverse polarity before resetting it on.

NOTE : If the DC output is used to charge a large capacity battery or an over-discharged battery, an excessive current may flow causing.



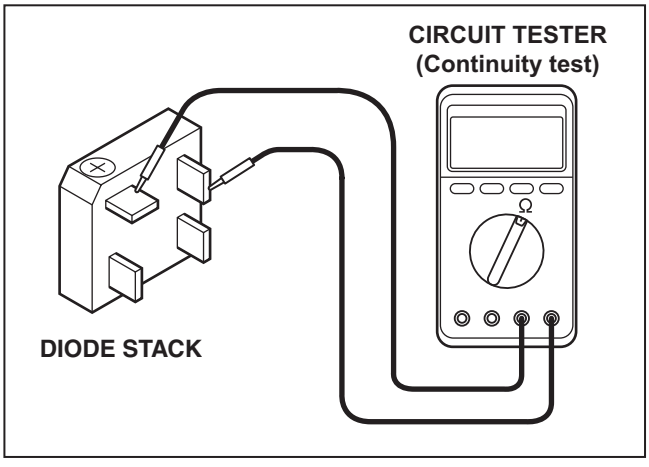
8-4-3 CHECK THE WIRING.

Check all the wires to be connected correctly.

8-4-4 CHECK THE DIODE STACK.

Remove the end cover and check the diode stack with a circuit tester.

Refer to Section 6-7 “DIODE STACK” for the checking procedure.



8-4-5 CHECK THE DC COIL

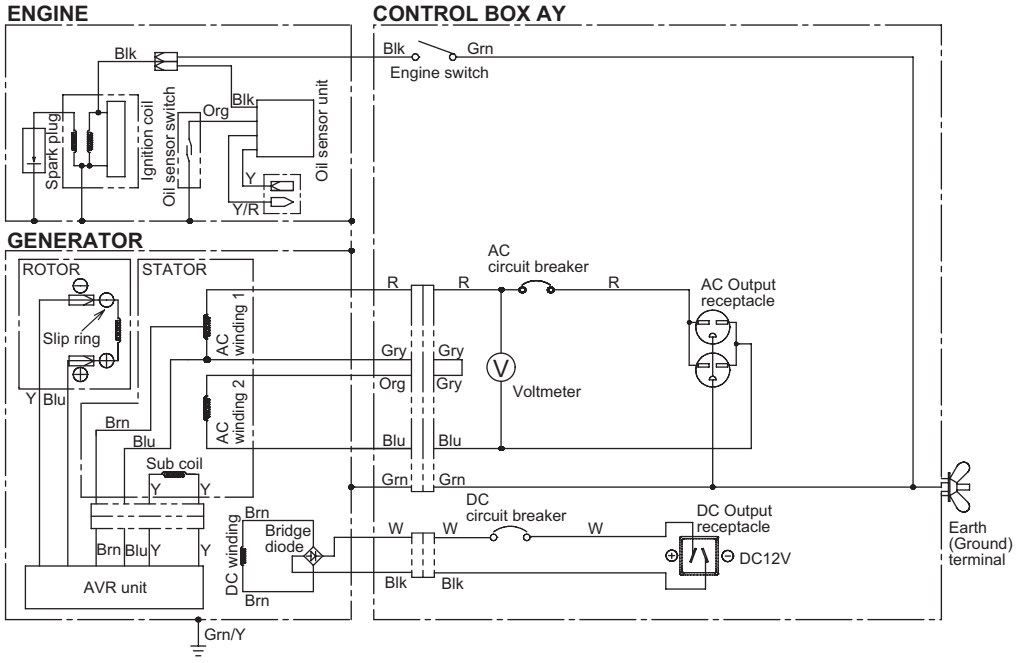
Check the resistance between two Brown leads from stator with a circuit tester.

If the resistance reading is much larger or smaller than the specified value, the DC coil of the stator is faulty. Replace stator with a new one.

	50Hz - 220V	60Hz - 220V	50Hz-230V	50Hz-240V	60Hz - 120V/240V
RGX3000	0.193	0.191	0.238	0.215	0.181
RGX3800	0.186	0.187	0.172	0.183	0.163
RGX5100	0.147	0.133	0.169	0.147	0.133

9. WIRING DIAGRAM

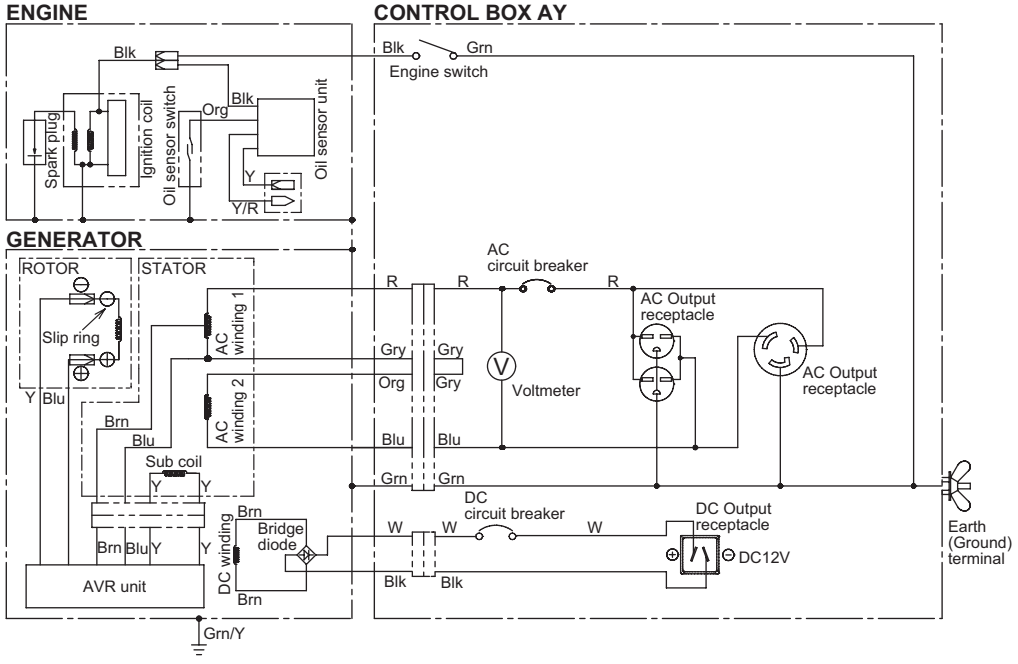
RGX3000 (50Hz-220, 240V)



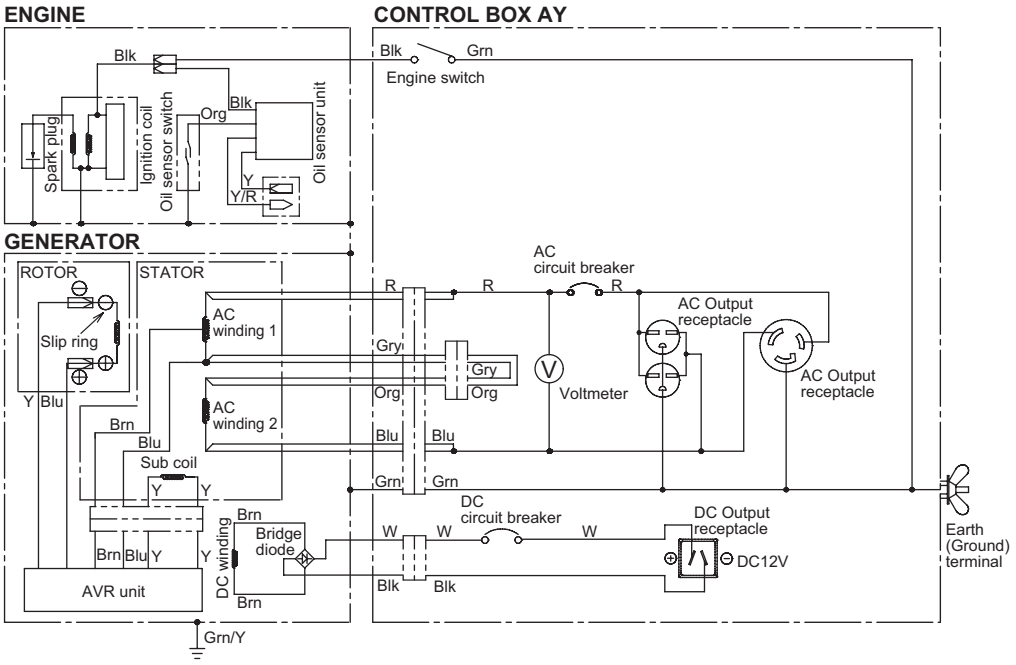
Wiring color code

Blk	: Black
Blk/W	: Black/White
Blu	: Blue
LBlu	: Light blue
Brn	: Brown
Brn/W	: Brown/White
Grn	: Green
Grn/W	: Green/White
Org	: Orange
Gry	: Gray
R	: Red
W	: White
Y	: Yellow
W/Blk	: White/Black
Grn/Y	: Green/Yellow
Pur	: Purple

RGX3800 (50Hz-220, 240V)



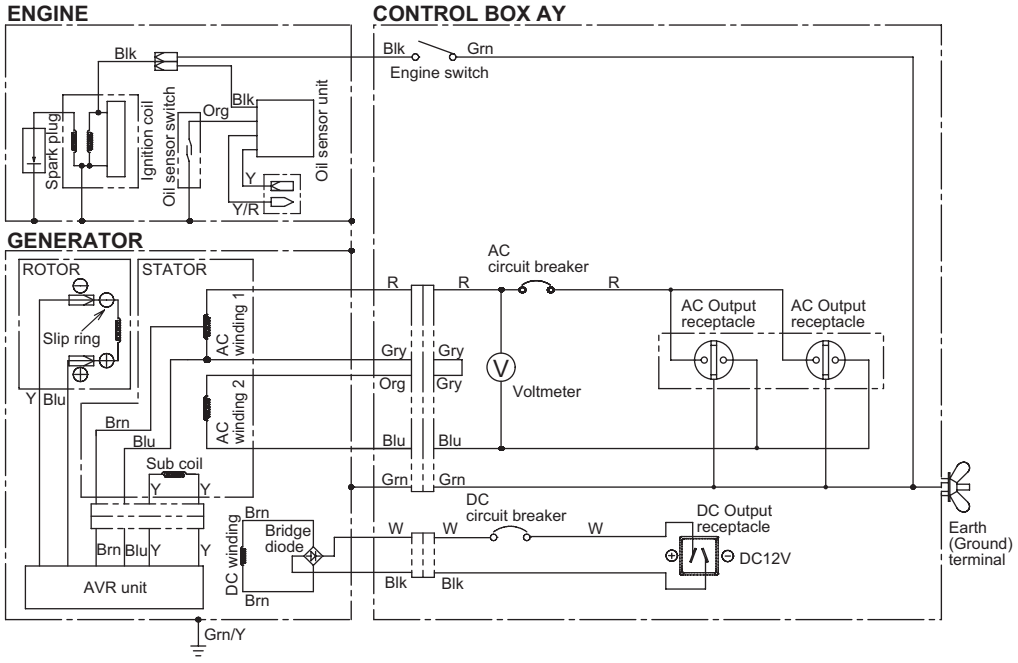
RGX5100 (50Hz-220, 240V)



Wiring color code

Blk	: Black
Blk/W	: Black/White
Blu	: Blue
LBlu	: Light blue
Brn	: Brown
Brn/W	: Brown/White
Grn	: Green
Grn/W	: Green/White
Org	: Orange
Gry	: Gray
R	: Red
W	: White
Y	: Yellow
W/Blk	: White/Black
Grn/Y	: Green/Yellow
Pur	: Purple

RGX3000 / 3800 (50Hz-230V)



Wiring color code

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Blk/W	: Black/White
Blu	: Blue
LBlu	: Light blue
Brn	: Brown
Brn/W	: Brown/White
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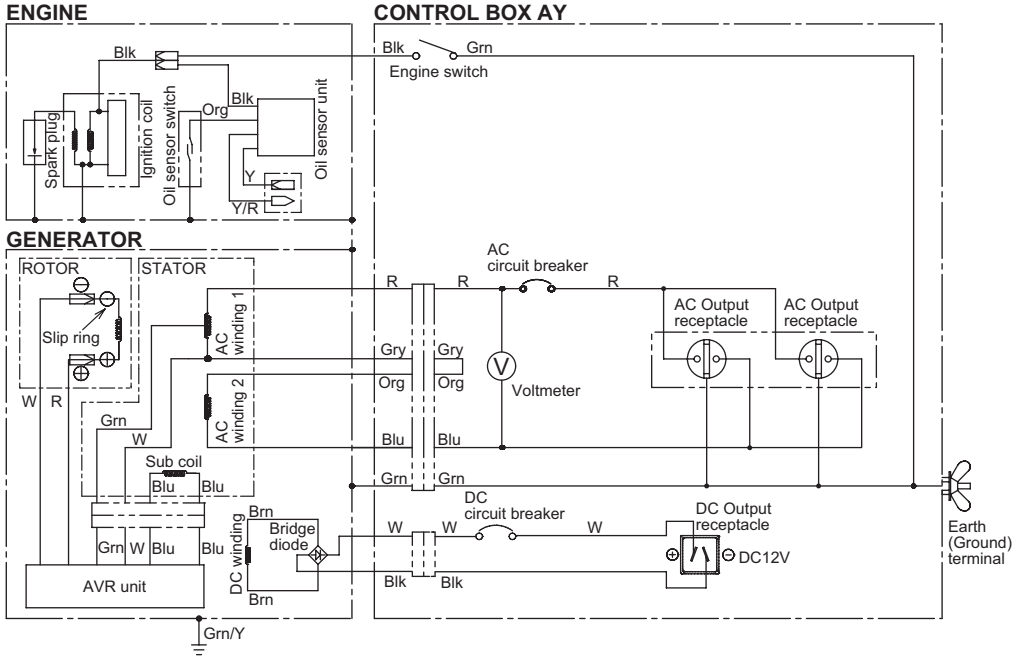
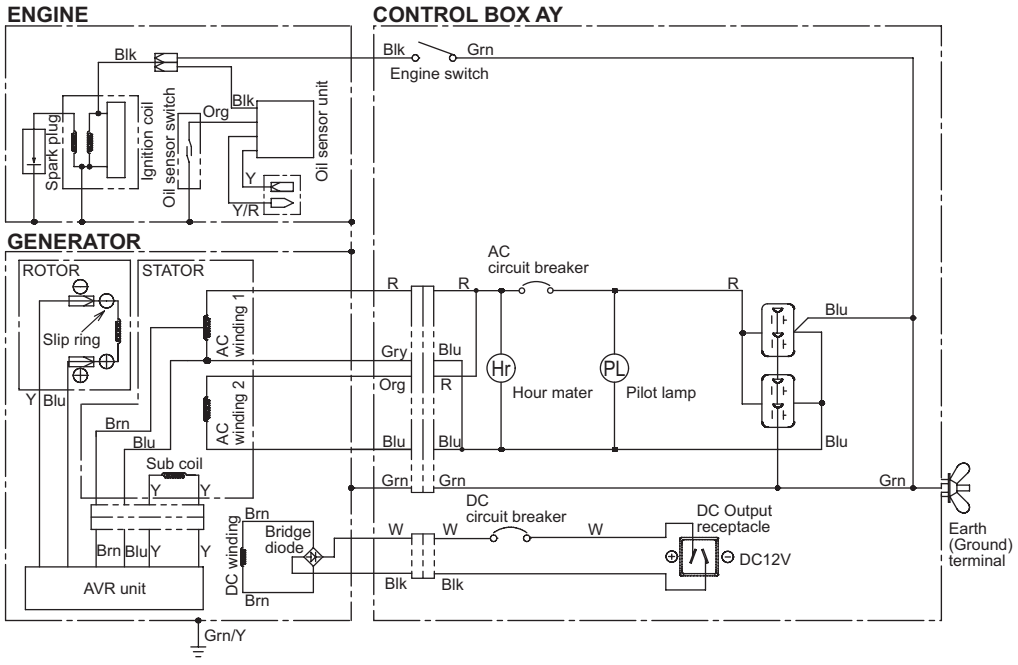
Grn/W	: Green/White
Org	: Orange
Gry	: Gray
R	: Red
W	: White
Y	: Yellow
W/Blk	: White/Black
Grn/Y	: Green/Yellow
Pur	: Purple

RGX5100 (50Hz-230V)



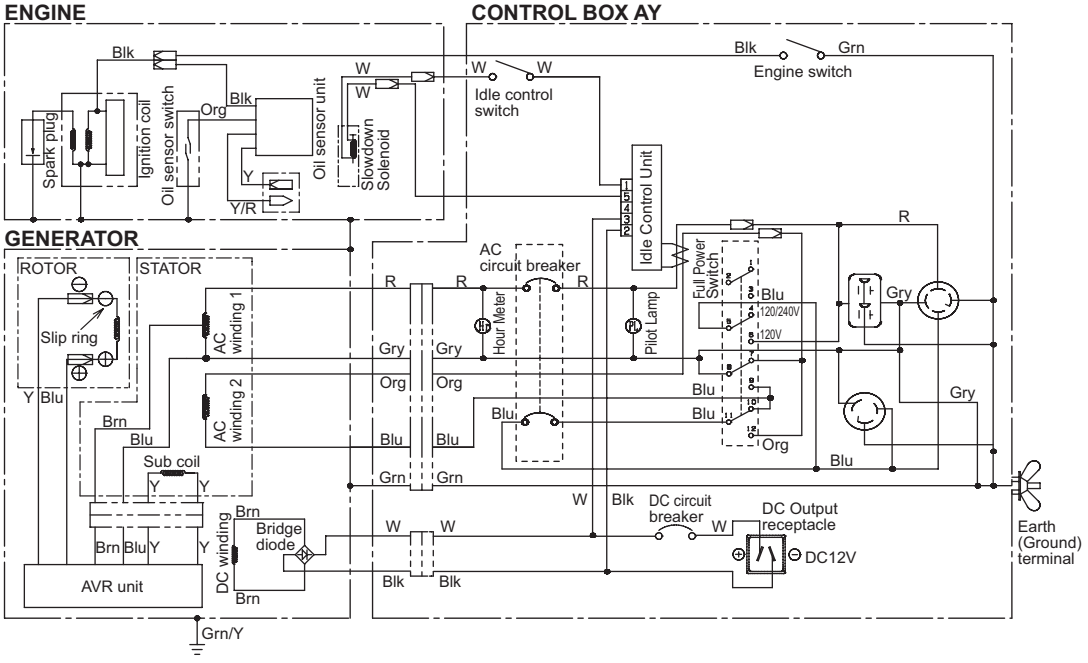
RGX3000 (60Hz-120V)



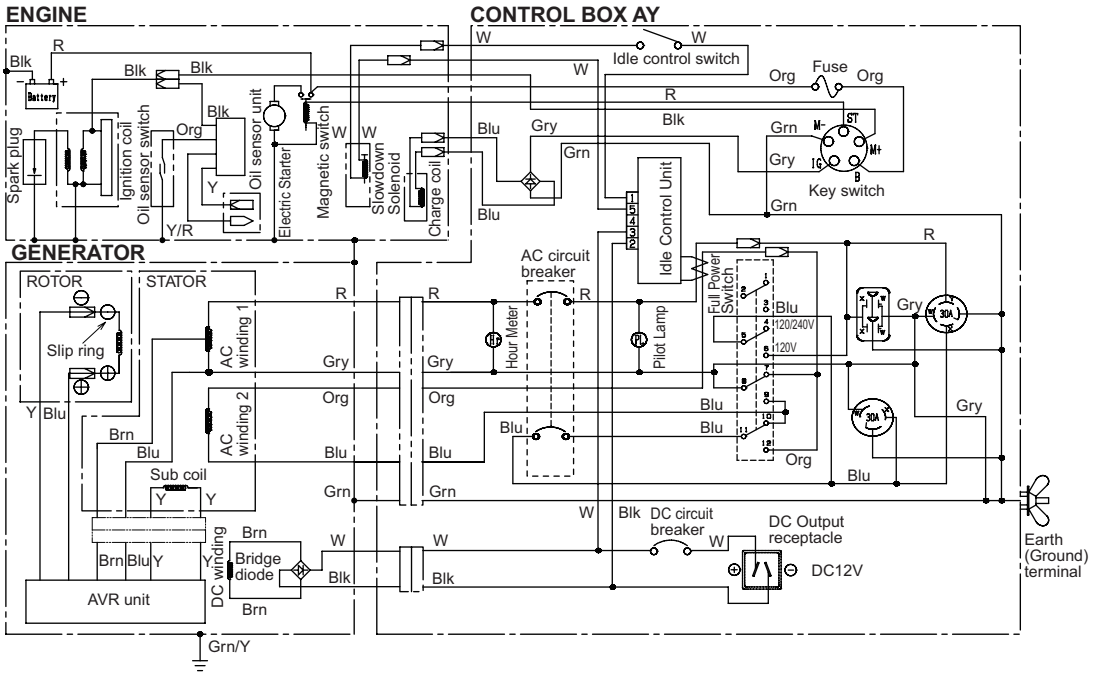
Wiring color code

Blk	: Black
Blk/W	: Black/White
Blu	: Blue
LBlu	: Light blue
Brn	: Brown
Brn/W	: Brown/White
Grn	: Green
Grn/W	: Green/White
Org	: Orange
Gry	: Gray
R	: Red
W	: White
Y	: Yellow
W/Blk	: White/Black
Grn/Y	: Green/Yellow
Pur	: Purple

RGX3800 (60Hz-120/240V)



RGX3800 (60Hz-120/240V) [Electric starter model]



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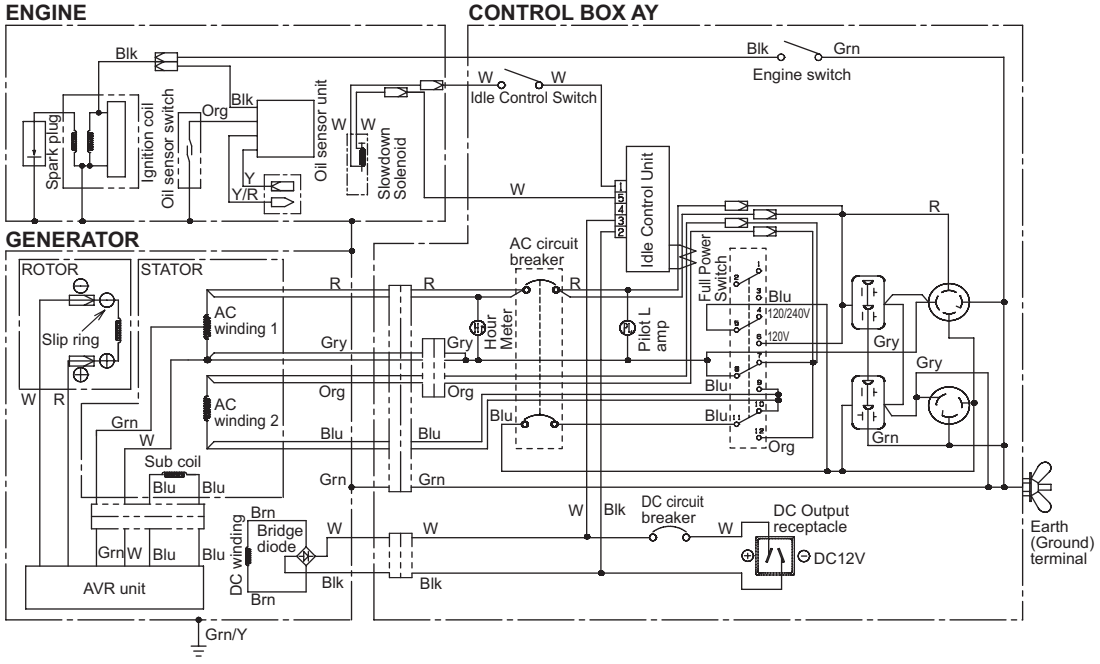
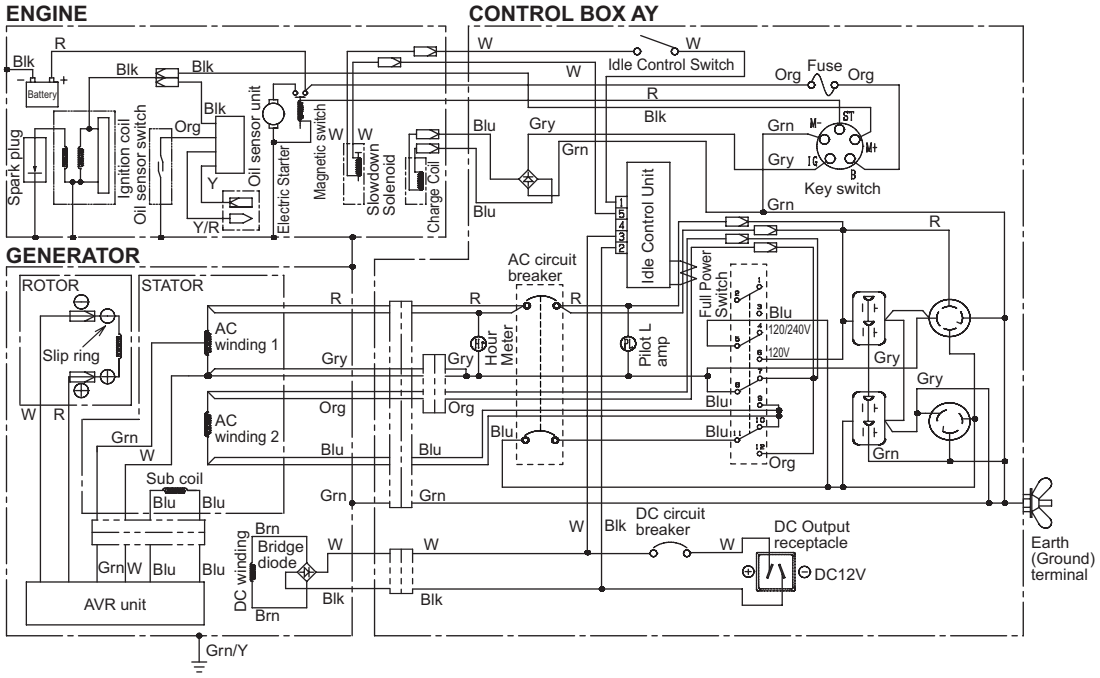
W	: White
Y	: Yellow
W/Blk	: White/Black
Grn/Y	: Green/Yellow
Pur	: Purple

RGX5100 (60Hz-120/240V)



RGX5100 (60Hz-120/240V) [Electric starter model]



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Brn	: Brown
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